A NEW AND COMPLETE

DICTIONARY

OF

ARTS and SCIENCES;

COMPREHENDING ALL

The Branches of Useful Knowledge,

WITH

ACCURATE DESCRIPTIONS as well of the various MACHINES, INSTRUMENTS, TOOLS, FIGURES, and SCHEMES necessary for illustrating them,

AS OF

The Classes, Kinds, Preparations, and Uses of NATURAL PRODUCTIONS, whether ANIMALS, VEGETABLES, MINERALS, FOSSILS, or FLUIDS;

Together with

The KINGDOMS, PROVINCES, CITIES, TOWNS, and other Remarkable Places throughout the WORLD.

Illustrated with above Three Hundred COPPER-PLATES, curiously engraved by Mr. JEFFERYS, Geographer to his Royal Highness the Prince of WALES.

The Whole extracted from the Best AUTHORS in all Languages.

By a SOCIETY of GENTLEMEN.

——————— *Huc undique Gaza*
Congeritur ——————— VIRG.

VOL. IV

LONDON:
Printed for W. OWEN, at Homer's Head, in Fleet-street.
MDCCLV.

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ARTS and SCIENCES.

R, or r, a liquid conſonant, being the ſeventeenth letter of our alphabet. Its ſound is formed by a guttural extruſion of the breath, vibrated through the mouth, with a ſort of quivering motion of the tongue drawn from the teeth, and cannulated with the tip a little elevated towards the palate. In greek words it is frequently aſpirated with an *h* after it, as in *rhapſody*, *rhetoric*, *&c.* otherwiſe it is always followed by a vowel at the beginning of words and ſyllables.

In the notes of the antients, R. or R O. ſignifies *Roma*; R. C. *Romana civitas*; R. G. C. *rei gerendæ cauſa*; R. F. E. D. *recte factum & dictum*; R G. F. *regis filius*; R. P. *res publica*, or *Romani principes*; and R. R. R. F. F. F. *res Romana ruet ferro, fame, flamma.*

Uſed as a numeral, R antiently ſtood for eighty, and with a daſh over it, thus $\overline{R}$, for eighty thouſand; but the greek r, or ρ, ſignified an hundred.

In the preſcriptions of phyſicians, R or ℞ ſtands for *recipe*, *i. e.* take.

RAAB, a city of lower-Hungary, ſituated at the confluence of the rivers Danube and Raab, and ſubject to the houſe of Auſtria: eaſt long. 18°, north lat. 48°.

RABATE, in falconry, is ſaid of a hawk, when by the motion of the hand, lure, *&c.* ſhe leaves off purſuing her prey or quarry.

RABBETING. in carpentry, the planning, or cutting of channels or grooves in boards, *&c.*

In ſhip-carpentry, it ſignifies the letting in of the planks of the ſhip into the keel; which, in the rake and run of a ſhip, is hollowed away, that the planks may join the cloſer.

RABBI, or RABBINS, a title which the phariſees and doctors of the law among the Jews aſſumed, and literally ſignifies maſters or excellents.

There were ſeveral gradations before they arrived at the dignity of a rabbin, which was not conferred till they had acquired the profoundeſt knowledge of the law and the traditions. It does not however appear that there was any fixed age, or previous examination neceſſary; but when a man had diſtinguiſhed himſelf by his ſkill in the written and oral law, and paſſed through the ſubordinate degrees, he was ſaluted a rabbin by the public voice.

Among the modern Jews, for near ſeven hundred years paſt, the learned men retain no other title than that of rabbi, or rabbins: they have great reſpect paid them, have the firſt places or ſeats in their ſynagogues, determine all matters of controverſy, and frequently pronounce upon civil affairs: they have even a power to excommunicate the diſobedient.

RABBINET, a ſmall piece of ordnance,

between a falconet and a baſe. See the article CANNON.

RABBINISTS, among the modern Jews, an appellation given to the doctrine of the rabbins concerning traditions, in oppoſition to the caraites, who reject all traditions. See CARAITE.

RABBIT, *cuniculus*, in zoology, a well known animal of the lepus, or hare-kind, with a very ſhort tail.

The rabbit, though a ſmaller, is a handſomer creature than the hare, but is of various colours even in the ſame country, its general one in this kingdom being a pale browniſh-grey on the back, and white on the belly; however, there are ſome darker, of a ſilvery-grey, and altogether white.

There is alſo a long-tailed ſpecies, of the ſize of our common rabbit, called the ſiberian rabbit, from its being frequent in Ruſſia and Tartary.

For the method of catching rabbits, by means of ferrets, ſee FERRET.

RACCOURCY, in heraldry, ſignifies the ſame as coupee; that is, cut off or ſhortened; and denotes a croſs, or other ordinary, that does not extend to the edge of the eſcutcheon, as they always do when abſolutely named without ſuch diſtinction.

RACE, in general, ſignifies running with others in order to obtain a prize, either on foot, or by riding on horſe-back, in chariots, *&c.*

Racing was one of the exerciſes among the antient grecian games, which was performed in a courſe containing an hundred and twenty-five paces; and thoſe who contended in theſe foot-races were frequently cloathed in armour. Chariot and horſe-races alſo made a part of theſe antient games. See GAMES.

For horſe-racing, as practiſed amongſt us, ſee HORSE-RACING.

RACE, in genealogy, a lineage or extraction continued from father to ſon.

RACHITIS, the RICKETS, in medicine. See the article RICKETS.

RACILLA, one of the leaſt of the iſlands of the Archipelago, near the iſland of Aio, not inhabited.

RACK, in the manege, a pace in which a horſe neither trots nor ambles, but ſhuffles as it were between.

The racking-pace is indeed much the ſame as the amble, only it is a ſwifter time and ſhorter tread.

RACK is alſo a wooden frame, made to hold hay or fodder for cattle.

RACK, an engine of torture, furniſhed with pullies and chords, *&c.* for extorting confeſſions from criminals.

RACK, ARAC, or ARRAC, in commerce, a ſpirituous liquor made by the Tartars of Tonguſia, who are ſubject to the czarina of Muſcovy. This kind of rack is made of mare's-milk, which is left to be ſour, and afterwards diſtilled twice or thrice between two earthen pots cloſely ſtopped, from whence the liquor runs through a ſmall wooden pipe. This liquor is more intoxicating than brandy diſtilled from wine.

Rack is alſo a ſpirituous liquor which the Engliſh get from Batavia or Malacca, of which there are three ſorts, the one being extracted from the cocoa-tree, the ſecond from rice, and the third from ſugar: but the firſt is the beſt and moſt in uſe. It is made of the bloſſom-bunch of the cocoa-tree: for which purpoſe they tie the bunch while it is ſtill wrapped up within its cod, or membrane, with a piece of packthread, and then with a knife make a-croſs cut in that bunch, a little above the place where it is tied, and adapt a pitcher to it to receive the liquor, which is called toddy, and is vinous, palatable and ſweet: others uſe a bamboe-cane inſtead of a pitcher. Having thus drawn the liquor, they let it ferment, and afterwards diſtil it.

Goa and Batavia are the chief places for rack. At Goa there are ſeveral kinds; ſingle, double, and treble diſtilled: but the double diſtilled, which is that commonly ſent abroad, is but a weak ſpirit when compared with batavia-rack; yet, on account of its peculiar and agreeable flavour, it is preferred to all the other racks of India. The prior rack, made at Madras, the Columbo and Quilone rack, being fiery hot ſpirits, are but little valued by the Europeans, and therefore ſeldom imported, though they are highly prized among the natives.

Rack, on being imported, pays a duty of 6 l. 15 s. 6 d. the ton, containing two hundred fifty-two gallons: and a drawback, on exportation, of 6 l. 1 s. 3 d. beſides which, it pays for the exciſe-duty, 4 s. 8 d. the gallon.

To RACK *wines, &c.* to draw them off from their lees, after their having ſtood long enough to clear and ſettle.

Hence rack-vintage is frequently uſed for the ſecond voyage our wine-merchants uſed to make into France for racked-wines.

RACKELSBURG,

RACKELSBURG, a town of Germany, in the circle of Auſtria, twenty-three miles ſouth-eaſt of Gratz.

RACKET, a kind of bat to ſtrike the ball with at tennis; uſually conſiſting of a lattice or net-work of cat-gut ſtrained very tight in a circle of wood, with a ſhaft or handle.

RACKET is alſo a kind of ſnow-ſhoe, or machine, which the ſavages of Canada bind to their feet, to enable them to walk more commodiouſly on the ſnow; made much in the manner of a tennis-racket. Its figure is a lozenge, of which the two obtuſe angles are turned off. It is bound about with very fine thongs of leather, the maſhes of which are much ſmaller and cloſer than thoſe of our rackets. In the middle is fitted a kind of ſhoe lined with wool or hair, to be tied on to the ancle.

RACKOON, *coati*, in zoology, an american quadruped of the ſhape of a beaver, only ſomewhat ſmaller, and with hair like that of a fox; its head too is like that of a fox, only that the ears are ſhorter, roundiſh, and naked; its tail is longer than its body, and not unlike that of a cat, with annular ſtreaks of different colours.

RADIÆA, in anatomy, a branch of the brachial artery. See ARTERY.

RADIÆUS, or RADIALIS. See the article RADIALIS.

RADIAL CURVES, are curves of the ſpiral kind, whoſe ordinates, if they may be ſo called, all terminate in the center of the including circle, appearing like radii of that circle, whence the name. See the articles CURVE and SPIRAL.

RADIALIS, or RADIÆUS, in anatomy, the name of two muſcles of the arm; one of which, called *radialis internus*, is one of the three flexor muſcles of the carpus, or hand, which ariſing from the internal condyle of the humerus, is inſerted into the bone of the carpus next the thumb; and the other, called *radialis externus*, is one of the three extenſor muſcles of the hand, which ariſing from the external condyle of the humerus, is inſerted into the firſt metacarpal bone. See FLEXOR and EXTENSOR.

RADIANT, or RADIATING POINT, in optics, is any point of a viſible object from whence rays proceed. See the articles VISION and RADIATION.

RADIANT, or RAYONANT, in heraldry. See the article RAYONANT.

RADIATED FLOWERS, in botany, are ſuch as have ſeveral ſemi floſcules ſet round a diſk, in form of a radiant ſtar: thoſe which have no ſuch rays are called diſcous flowers. See the articles FLOWER, BOTANY, *&c.*

The term radiated is alſo uſed with reſpect to one of the antient crowns. See the article CROWN.

RADIATION, the act of a body emitting or diffuſing rays of light all round, as from a center. See the articles LIGHT, RAY, *&c.*

Radiation is conſidered in optics as threefold, *viz.* direct, reflected, or refracted. See the articles VISION, REFLECTION, and REFRACTION.

Though every viſible body be radiating, yet it need not be luminous in itſelf, but only illuminated; that is, it may diffuſe rays received from a luminous body, as well as emit thoſe of its own.

Some uſe the term radiation, to denote the motion of the animal ſpirits; whereas others rather incline to the opinion of their circulation. See the articles ANIMAL SPIRITS, CIRCULATION, *&c.*

Plane of RADIATION. See PLANE.

RADICAL, in general, ſomething that ſerves as a baſis or foundation.

Hence phyſicians talk much of a radical moiſture. See MOISTURE.

In grammar, we give the appellation radical to primitive words, in contradiſtinction to compounds and derivatives. See the article PRIMITIVE.

Algebraiſts alſo ſpeak of the radical ſign of quantities, which is the character expreſſing their roots. See ROOT and CHARACTER.

RADICATION, a term uſed by ſome for the action whereby plants take root, or ſhoot out roots. See the articles ROOT and VEGETATION.

RADICLE, that part of the ſeeds of all plants, which upon vegetating becomes its root, and is diſcoverable by the microſcope. See VEGETATION.

RADICOFANI, a town of Tuſcany, forty-two miles ſouth of Sienna.

RADICULA, in botany, a plant otherwiſe called ſiſymbrium. See the article SISYMBRIUM.

RADIOMETER, an inſtrument otherwiſe called the fore ſtaff. See the article FORE-STAFF.

RADISH, *raphanus*, in botany, *&c.* See the article RAPHANUS.

RADIUS, in geometry, the ſemi-diameter of a circle, or a right line drawn from the center to the circumference. See the article CIRCLE.

In

In trigonometry, the radius is termed the whole ſine, or ſine of 90°. See the article SINE.

For the radius of the evolute, of curvature, &c. in the higher geometry, ſee EVOLUTE, CURVATURE, &c.

Some alſo call the fore-ſtaff *radius aſtronomicus*. See FORE-STAFF.

RADIUS, in anatomy, the exterior bone of the arm, deſcending along with the ulna from the elbow to the wriſt. See the article SKELETON.

In its upper extremity there is a glenoid cavity for its articulation with the humerus; alſo a creſt, by means of which it is articulated with the ulna: in the lower extremity the head is thicker, and of a more angular figure, with a very large hollow in its middle, for its articulation with the wriſt.

RADIX, the ſame with root. See the article ROOT.

RADNOR, the capital of the county of Radnor in Wales, ſituated in weſt long. 3° 6′, north lat. 52° 20.

RAFFLING, a game with three dice, in which he who throws the greateſt pair, or pair royal, in three caſts, wins the prize or ſtake.

The raffle is properly a doublet or triplet: for a raffle of all aces or duces, carries it againſt mere points.

Raffling is alſo uſed when a number of people club for the purchaſe of a commodity; and he that throws the higheſt on three dice takes it.

RAFTERS, in building, are pieces of timber, which ſtanding by pairs on the reaſon or raiſing piece, meet in an angle at the top, and form the roof of a building.

It is a rule in building that no raſters ſhould ſtand farther than twelve inches from one another: and as to their ſizes or ſcantlings, it is provided by act of parliament, that principal rafters, from twelve feet ſix inches to fourteen feet ſix inches long, be five inches broad at the top and eight at the bottom, and ſix inches thick. Thoſe from fourteen feet ſix inches to eighteen feet ſix inches long, to be nine inches broad at the foot, ſeven inches at the top, and ſeven inches thick: and thoſe from eighteen feet ſix inches, to twenty-one feet ſix inches long, to be ten inches broad at the foot, eight at the top, and eight thick. Single rafters, eight feet in length, muſt have four inches and a half, and three inches three quarters in their ſquare. Thoſe of nine feet long muſt be five and four inches ſquare.

Principal rafters ſhould be nearly as thick at the bottom as the beam, and ſhould diminiſh in their length one fifth or one ſixth of their breadth; the king-poſts ſhould be as thick as the principal rafters, and their breadth, according to the bigneſs of them that are intended to be ſet into them, the middle part being left ſomewhat broader than the thickneſs.

RAG, or RAKE, a company, or herd of young colts.

RAG-WORT, *jacobæa*, in botany. See the article JACOBÆA.

RAGGED-HAWK, among falconers, is one that has his feathers broken. See the article HAWK.

RAGGED, in heraldry. See RAGULED.

RAGOUT, or RAGOO, a ſawce, or ſeaſoning, intended to rouſe the appetite when loſt or languiſhing.

This term is alſo uſed for any high ſeaſoned diſh prepared of fleſh, fiſh, greens, or the like; by ſtewing them with bacon, ſalt, pepper, cloves, and the like ingredients. We have ragouts of celery, of endive, aſparagus, cock's-combs, giblets, cray-fiſh, &c.

The antients had a ragout called garum, made of the putrified guts of a certain fiſh kept till it diſſolved into a mere ſanies, which was thought ſuch a dainty, that, according to Pliny, its price equalled that of the richeſt perfumes.

RAGULED, or RAGGED, in heraldry, jagged or knotted. This term is applied to a croſs formed of the trunks of two trees without their branches, of which they ſhew only the ſtumps. See plate CCXXVII. fig. 2.

Raguled differs from indented, in that the latter is regular, the former not.

RAJA, the title of the indian black princes, the remains of thoſe who ruled there before the moguls. Some of the rajas are ſaid to preſerve their independency, eſpecially in the mountainous parts; but moſt of them pay an annual tribute to the mogul. The Indians call them *rai*; the Perſians *raian*, in the plural; and our travellers *rajas*, or *ragias*.

RAJA, in ichthyology, a genus of the chondropterygious order of fiſhes, with five apertures of the gills on each ſide; the head and body are depreſſed or flat; the ſides are terminated with broad fins, which ſupply the place of pectoral fins in other fiſhes; the eyes are

in

in the upper part of the head, and behind them is a ſingle foramen; and the tail is uſually long and ſlender.

To this genus belong the thornback, fire-flaire, ſea-eagle, white-horſe, ſkaite, and torpedo or cramp-fiſh.

RAJAMAHAL, a city of the hither India, ſituated on the river Ganges, in 86° 30′ eaſt long. and 24° 30′ north lat.

RAJANIA, in botany, a genus of the *dioecia hexandria* claſs of plants, without any flower-petals; the fruit is roundiſh, and contains a ſingle ſeed of the ſame ſhape.

RAIL, in architecture, is uſed in different ſenſes, as for thoſe pieces of timber which lie horizontally between the pannels of wainſcot; for thoſe which lie over and under the baluſters in balconies, ſtaircaſes, and the like; and alſo for thoſe pieces of timber which lie horizontally from poſt to poſt in fences, either with poles or without.

RAIL, *ortygometra*, in ornithology, a genus of birds of the order of the ſcolopaces, the beak of which is ſhorter than the toes: it is of a compreſſed form, and terminated in a point; but the two chaps are equal in length. It is of the ſize of the common magpye, and is an elegant bird, of a bright brown colour, variegated with black ſpots; it is common in rich paſtures, where its conſtant note is *crex, crex*.

RAIN, a watery-meteor, which deſcends from the clouds in form of drops of water. See CLOUD, METEOR, *&c.*

Rain is apparently the precipitated vapours of watery clouds: thus, when various congeries of clouds are driven together by the agitation of the winds, they mix and run into one body, and by that means diſſolve and condenſe each other into their former ſubſtance of water; alſo the coldneſs of the air is a great means to collect, compact, and condenſe clouds into water; which being heavier than the air, muſt of neceſſity fall through it in the form we call rain. Now the reaſon why it falls in drops, and not in whole quantities, as it becomes condenſed, is the reſiſtance of the air; whereby, being broken and divided into ſmaller and ſmaller parts, the farther it paſſes through the air, it at laſt arrives to us in ſmall drops.

Mr. Derham accounts for the precipitation hence, that the veſiculæ being full of air, when they meet with a colder air than that they contain, their air is contracted into a leſs ſpace; and, conſequently, the watery ſhell rendered thicker, ſo as to become heavier than the air, *&c.*

Others only allow the cold a part in the action, and bring in the winds as ſharers with it: indeed, it is plain, that a wind, blowing againſt a cloud, will drive its veſiculæ upon one another, by which means ſeveral of them coaleſcing, will be enabled to deſcend; and the effect will be ſtill more conſiderable if two oppoſite winds blow towards the ſame place. Add to this, that clouds already formed, happening to be aggravated by freſh acceſſions of vapour continually aſcending, may thence be enabled to deſcend.

According to Rohault, the great cauſe of rain is the heat of the air, which, after continuing for ſome time near the earth, is at length carried up on high by a wind, and there thawing the ſnowy villi, or flocks of the half frozen veſiculæ, reduces them into drops; which, coaleſcing, deſcend.

Others, as Dr. Clarke, *&c.* aſcribe this deſcent of the clouds rather to an alteration of the atmoſphere than of the veſiculæ; and ſuppoſe it to ariſe from a diminution of the elaſtic force of the air. This elaſticity, which depends chiefly or wholly on the terrene exhalations, being weakened, the atmoſphere ſinks under its burden, and the clouds fall.

Now the little veſicles, being once upon the deſcent, will perſiſt therein, notwithſtanding the increaſe of reſiſtance they every moment meet with. For as they all tend toward the center of the earth, the farther they fall, the more coalitions will they make; and the more coalitions, the more matter will there be under the ſame ſurface; the ſurface only increaſing as the ſquares, but the ſolidity as the cube; and the more matter under the ſame ſurface, the leſs reſiſtance there will be to the ſame matter. Thus, if the cold, wind, *&c.* act early enough to precipitate the aſcending veſicles, before they are arrived at any conſiderable height, the coalitions being but few, the drops will be proportionably ſmall; and thus is formed a dew. If the vapours be more copious, and riſe a little higher, we have a miſt or fog. A little higher ſtill, and they produce a ſmall rain, *&c.* If they neither meet with cold nor wind, they form a heavy, thick, dark ſky.

Hence,

Hence, many of the phænomena of the weather may be accounted for: as, why a cold ſummer is always a wet one, and a warm, a dry one; Why we have commonly moſt rain about the equinoxes; Why a ſettled, thick, cloſe ſky, ſcarce ever rains, till it have been firſt clear; As to the quantity of rain that falls, its proportion in ſeveral places at the ſame time, and in the ſame place at ſeveral times, we have ſtore of obſervations, journals, *&c.* in the Memoirs of the french academy, Philoſophical Tranſactions, *&c.*

Preternatural RAINS, as of blood, are very frequent in our annals, and even natural hiſtories; yet, if enquired into, they will be found other things than rain. Thoſe rains, Dr. Merret obſerves, are nothing more than the excrements of inſects, as butterflies, *&c.* And he adds, that it is very evident the rains of wheat are nothing but ivy-berries ſwallowed by the ſtarling, and voided again by ſtool.

RAINS, in the ſea-language, all that tract of ſea to the northward of the equator, between four and ten degrees latitude, and lying between the meridian of Cape Verde and that of the eaſtermoſt iſlands of the ſame name.

It is ſo called from the almoſt continual calms, conſtant rains, thunder and lightning found there.

RAIN-BOW, *iris*, in meteorology, a meteor, in form of a party-coloured arch, or ſemi-circle, exhibited in a rainy ſky, oppoſite to the ſun, by the refraction of his rays in the drops of falling rain. See the article REFRACTION.

In order to illuſtrate this phænomenon, ſuppoſe BNFG (Pl. CCXXVI. fig. 1.) to be a ſpherical drop of falling rain, and AN a ray of the ſun falling upon it in the point N; which ray ſuppoſe refracted to F, from thence reflected to G, and there again refracted in the direction GR to the eye of a ſpectator; and let IG be perpendicular to the drop in the point G; then will the ray or beam of light, by its refraction at G, be ſeparated into ſeveral ſorts of rays, which will paint their reſpective colours in that part of the drop; of which that next the perpendicular IG will be red, as being leaſt refracted; and the reſt in order above it, *viz.* orange, yellow, green, blue, indigo, violet. Now it is found by computation, that the greateſt angle SEO, (*ibid.* fig. 2.) or EOP, becauſe OP parallel to SE, under which the moſt refrangible rays can come to the eye of the ſpectator at O, is 40° 17′; and that the great angle FOP, under which the moſt refrangible rays come to the eye at O, is 42° 2′: and ſo all the particles of water, within the difference of thoſe two angles, EF, will exhibit ſeverally the various colours of the priſm, and conſtitute the interior rain-bow in the cloud. See COLOUR.

If the beam of light go not out of the drop, at G, but is reflected a ſecond time, to H; (*ibid.* fig. 1 and 2.) and is there refracted in the direction HS, making the angle SYA with the incident ray AN, it will paint on the part H the ſeveral colours of light; but in an inverſe order to the former, and more faint, by reaſon of the rays loſt by the ſecond reflection. It has been found alſo, that the leaſt angle SGO, or GOP, under which the leaſt refrangible rays can come to the eye at O, after two reflections and two refractions, is 50° 57′; and the leaſt angle HOP, under which the moſt refrangible rays can come to the eye in this caſe, is 54° 7′: whence all the colours of the exterior rain-bow, will be formed in the drops from G to H; which is the breadth of this bow, *viz.* 3° 10′; whereas the breadth of the former, or interior bow, *viz.* EF, is but 1° 45′; and the diſtance between the bows, *viz.* FG, is 8° 55′. And ſuch would be the meaſure of the bows, were the ſun but a point; but ſince his body ſubtends an angle of half a degree, it is evident, by ſo much will each bow be increaſed, and their diſtance diminiſhed.

To apprehend rightly the different affections of the rain-bow, we muſt attend to the following particulars. 1. That though the rain-bow be occaſioned by the refracted and reflected light of the ſun falling on the drops of rain, yet neither of them is produced by any rays falling on any part of the drop indifferently, but by thoſe only which fall on the ſurface of the drop BLQG (*ibid.* fig. 1, 2, 3.) in or about the point N, as the ray AN; thoſe which fall nearer to B, or farther towards L, being unconcerned in this production. 2. The internal bow is produced by two refractions and one reflection. The firſt refraction is of the incident rays extremely near AN, by which they proceed from N to one common point or focus at F, from whence they are reflected to G, and are there a ſecond time refracted

RAIN-BOW.

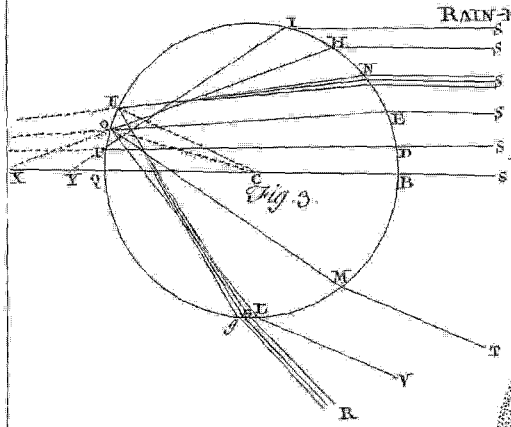


Fig. 3.

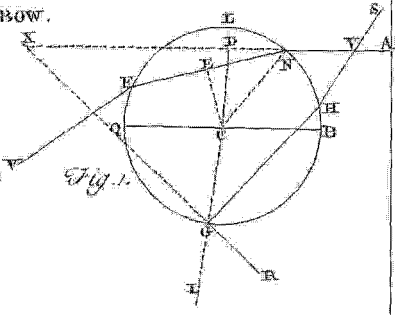


Fig. 1.

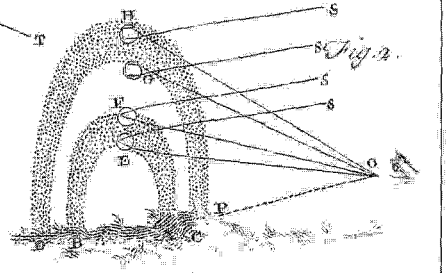


Fig. 2.

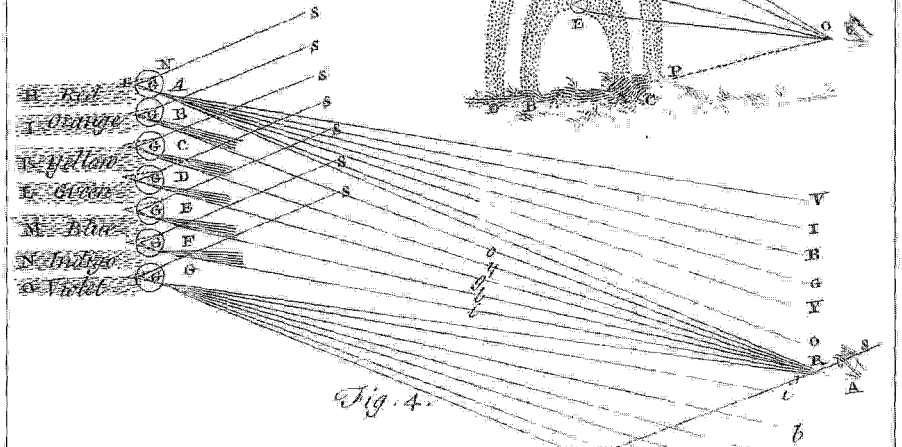


Fig. 4.

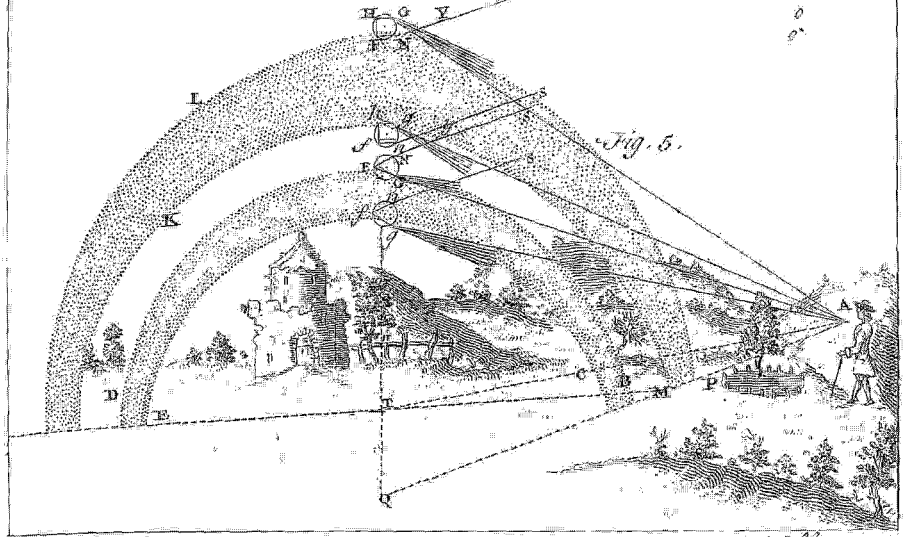


Fig. 5.

J. Jefferys sculp.

refracted towards R, and produce the various colours of the ſaid bow. 3. There is a neceſſity that ſeveral rays ſhould be refracted together to the point F, that being reflected together from thence to G they may there go out parallel, and ſo come in quantity ſufficient to excite the ſenſation of colours in a ſtrong and lively manner. Now thoſe rays, and thoſe only, which are incident on the globule about the point N, can do this, as will appear from what follows: for, 4. The point F makes the arch QF a *maximum*, or the diſtance QF from the axis of the drop SQ is greater than any other diſtance from whence any other rays nearer to the axis, as SD, SE, or farther from it, as SH, SI, are reflected; becauſe thoſe which are nearer after the firſt refraction tend to points in the axis produced more remote than that to which the ray SN tends; and therefore as their diſtance from the axis increaſes, ſo likewiſe will the diſtances of their points of reflection QP, QO, till the ray becomes SN; after which the rays more remote from the axis, as SH, SI, are refracted towards the points XY, which are nearer and nearer to the axis; and this occaſions the points of reflection on the fartheſt ſide of the drop to decreaſe again from F towards Q. 5. Hence it will neceſſarily happen, that ſome rays above and below the ray SN will fall upon the ſame point, as O or P, on the fartheſt ſide; and for that reaſon they will be ſo reflected from thence as to go out of the drop by refraction parallel to each other. Thus let SE below, and SH above the ray SN, be refracted both to one point O; from hence they will be reflected to M and L, and will there emerge parallel, 'tis true, but alone; being diveſted of their intermediate rays SN, which going to a different point F will be reflected in a different direction to G, and emerge on one ſide, and not between thoſe rays, as when they were incident on the drop. All which is evident from the figure. 6. As this will be the caſe of all the rays which are not indefinitely near to SN, it is plain, that being deprived of the intermediate rays, their denſity will be ſo far diminiſhed, as to render them ineffectual for exciting the ſenſation of colours; and they are therefore called inefficacious rays, in contradiſtinction to thoſe which enter the drop near SN, and which, having the ſame point F of reflection, are not ſcattered like the others, but emerge together at G, ſo as to conſtitute a beam GR of the ſame denſity with the incident beam SN, and therefore capable of exhibiting a vivid appearance of colours, and for this reaſon are called efficacious rays.

Phænomena of the RAINBOW. The firſt is, that each is variegated with all the priſmatic colours. This is a neceſſary conſequence of the different refrangibility of the rays refracted and reflected in drops of falling rain. Let *A* (*ibid.* fig. 4.) be ſuch a drop, SN a ray entering it at N, which is refracted to F, from whence refracted to G, where, as it emerges, it is refracted into all the ſeveral ſorts of rays of which it is compoſed, *viz.* GR, the leaſt refrangible or red-making ray, GO the orange, GY the yellow, GG the green, GB the blue, GI the indigo, and GV the violet, or moſt refrangible ray.

The truth of this may be eaſily proved by experiment, by ſuſpending a glaſs globe filled with water in the ſun-ſhine, and viewing it in ſuch a poſition, that the rays SN will fall upon it, and emerge to the eye at A, under the ſeveral angles from SFR to SFV; which may be eaſily effected by letting the globe deſcend from *A* to G, by a ſtring going over a pulley.

Hence, the ſecond phænomenon, *viz.* the circular form, is accounted for, and alſo the third, which is the breadth of the bow; for that will be equal to the angle $ARG = RGV = 1^\circ\ 45'$, where the ray, as here, emerges after one reflection. Theſe particulars are repreſented more completely in fig. 5. where BGD is the red circumference formed by the rotation of the ray *A*G, that can firſt come to the eye at A; and C*g*E is the violet arch formed by the leaſt refrangible ray *g A*; after which the rays are all refracted below the eye. And thus, by the intermediate rays and colours, the whole interior bow is produced.

The fourth phænomenon is the appearance of two bows. This follows from hence, that after an efficacious ray of light SN, entering a drop of rain, has been twice reflected on the fartheſt ſide at F and H, it will emerge refracted into all its ſimple or conſtituent rays at G upon the upper ſide of the drop, ſo as to make with the incident ray the angle $GYN = SYA = 54^\circ\ 10'$, if that ray

be the violet ſort, or moſt refrangible; but if it be of the red or leaſt refrangible ſort, then the ſaid angle is but 50° 58′ = S *y* A.

Therefore, all thoſe drops which are ſo ſituated around the eye, that their moſt refrangible rays ſhall fall upon it, muſt with thoſe rays make an angle with the line AP paſſing through the eye parallel to the ſun's rays, *viz.* the angle GAP, equal to the angle SYA, or GAP = 54° 10′. Theſe rays, therefore, will every-where exhibit a violet colour in the arch PGL. For the ſame reaſon, thoſe drops whoſe leaſt refrangible rays fall upon the eye at A, make the angle *g* AP = 50° 58′; and ſo the ray A *g*, revolving about the axis AQ, will deſcribe the circular arch M *g* K, which will exhibit the deepeſt red; and all the drops between G and *g* will paint the ſeveral other coloured peripheries, all which together will complete the exterior bow.

The fifth phænomenon is the greater breadth of the exterior bow. Thus, if from 54° 10′ we ſubduct 50° 58′, we ſhall have 3° 12′ = G*g* = the width of the outer bow; which, therefore, is almoſt twice as wide as the interior bow.

The ſixth phænomenon is the diſtance between the two bows, which is thus determined: from the angle which the leaſt refrangible ray in the upper bow makes with the axis AP, *viz.* 50° 58′, ſubtract the angle 42° 2′ which the moſt refrangible rays make therewith in the lower bow, and the remainder 8° 56′ = *g* AF is the arch of diſtance between the bows.

The ſeventh phænomenon is the inverſe order of the colours in the two bows. This follows from the contrary parts of the drop on which the ray is incident, and from whence it emerges and is refracted. Thus, becauſe the rays SN enter the upper part of the drop, and emerge from the lower, it is evident the rays refracted in this caſe (*viz.* in the interior bow) will have a ſituation quite the reverſe of thoſe which enter on the lower part of the drop, and are refracted from the upper, as in the exterior bow, whoſe colours are violet, indigo, blue, green, yellow, orange, and red; whilſt thoſe of the other are red, orange, yellow, green, blue, indigo, and violet; counting from the upper parts downwards in both.

The eighth phænomenon is the faintneſs of the exterior bow, in compariſon of the interior one. This is the conſequence of the rays being twice reflected within the drops which form the outer bow. They who make the experiment in a dark chamber, may wonder when they obſerve how large a part of the beam (that enters the globule at N) goes out at F, that there ſhould be enough in the remaining part F G to exhibit the colours ſo ſtrong and vivid in the firſt bow as they appear; but then, conſidering how much of this reſidual ray is refracted at G, it is rather a wonder how the very ſmall part reflected to H, ſhould there, when refracted, be in quantity ſufficient to excite any diſtinct ideas of colours at all.

The ninth phænomenon is, that ſometimes more than two bows appear; as in a very black cloud we have obſerved four, and a faint appearance of a fifth: but this happens rarely. Now, theſe ſpurious bows, as we may call them, cannot be formed in the manner as the two principal bows are, that is, by refraction after a third, fourth, fifth, *&c.* refraction; for the beam is by much too weak to exhibit colours by refraction, even after the third reflection only, much leſs would it after a fourth or fifth. Beſides, though after a third and fourth reflection of the rays they ſhould be ſuppoſed capable of ſhewing their colours, yet the bows made thereby would not appear at the ſame time with the other two, nor in the ſame part of the heavens, but in the rain between us and the ſun, and muſt be viewed by the ſpectator's face turned towards the ſun, and not from it, as in the other caſe.

The tenth phænomenon, is the appearance of the bows in that part of the heavens oppoſite to the ſun. This neceſſarily happens from the incident and emergent ray being both on one ſide of the drop; for it is evident, that in order to ſee the colours, we muſt look to that part againſt which the ſun ſhines.

The eleventh phænomenon is, that they never appear but when and where it rains. This is becauſe rain affords a ſufficient plenty of drops, or aqueous ſpherules, proper to reflect and refract the light fit for this purpoſe, which cannot be done without a requiſite ſize, figure, and diſpoſition of the particles, which the vapour of the cloud does not admit, and therefore clouds alone exhibit no ſuch appearance.

The

The twelfth phænomenon is the dimenſion of the bows. This is determined eaſily; for continuing the axis AP to Q, the center of the bows, we have the ſemidiameter of each bow in the angle QAg, or QAG; the double of which gives the angles which the whole diameters of the bows ſubtend, and are therefore the meaſure of their magnitude.

The thirteenth phænomenon is the altitude of the bow above the horizon, or ſurface of the earth. This is equal to the angle GAT, which may be taken by a quadrant, or it may be known for any time by having given the ſun's altitude, which is equal to the angle TAQ; which therefore ſubducted from the conſtant angles QAF, or QAY, will always leave the angle of the apparent height of the bow.

Lunar RAINBOW. The moon ſometimes alſo exhibits the phænomenon of an iris, by the refraction of her rays in drops of rain in the night-time.

Ariſtotle ſays, he was the firſt that ever obſerved it; and adds, that it is never viſible, but at the time of full moon.

The lunar iris has all the colours of the ſolar, only fainter. See Phil. Tranſ. n° 331.

Marine RAINBOW, the ſea-bow, is a phænomenon ſometimes obſerved in a much agitated ſea, when the wind, ſweeping part of the tops of the waves, carries them aloft; ſo that the rays of the ſun are refracted, &c. as in a common ſhower.

F. Bourzes, in Phil. Tranſ. obſerves, that there are ſcarce above two colours diſtinguiſhable, a dark yellow on the ſide next the ſun, and a pale green on the oppoſite ſide. But there are ſometimes twenty or thirty of them ſeen together.

They appear at noon-day, and in a poſition oppoſite to that of the common bow, the concave ſide being turned upwards.

There is a kind of white colourleſs rainbow which Mentzelius and others ſaw at noon-day. M. Marriote, in his fourth Eſſaie de Phyſique, ſays, they are formed in miſts, as the others are in ſhowers; having obſerved ſeveral of them both after ſun-riſing and in the night.

The want of colours in theſe, is owing to the exceeding tenuity of the veſicles of the vapour, which being only little watery pellicles bloated with air, the rays of light undergo but little refraction in paſſing out of air into them. Hence the rays are reflected from them compounded, as they come.

Rohault mentions coloured rainbows on the graſs formed in the morning dew.

RAISER, in building, a board ſet on edge under the fore ſide of a ſtep, ſtair, &c. See the article STAIR.

RAISING, in the manege, one of the three actions of a horſe's legs, the other two being the ſtay and the tread.

In caprioles, curvets, &c. the raiſing or lifting up of his leg is eſteemed good, if he perform it hardily and with eaſe; not croſſing his legs, nor carrying his feet too much out or in, yet bending his knees as much as is needful.

RAISING-PIECES, or REASON-PIECES, in architecture, are pieces that lie under the beams, and over the poſts or puncheons.

RAISINS, grapes prepared by ſuffering them to remain on the vine till they are perfectly ripe, and then drying them in the ſun, or by the heat of an oven. The difference between raiſins dried in the ſun, and thoſe dried in ovens, is very obvious: the former are ſweet and pleaſant, but the latter have a latent acidity with the ſweetneſs that renders them much leſs agreeable.

The common way of drying grapes for raiſins, is to tie two or three bunches of them together while yet on the vine, and dip them into a hot lixivium of wood-aſhes with a little of the oil of olives in it. This diſpoſes them to ſhrink and wrinkle, and after this they are left on the vine three or four days ſeparated on ſticks in an horizontal ſituation, and then dried in the ſun at leiſure, after being cut from the tree. The fineſt and beſt raiſins are thoſe called in ſome places Damaſcus and Jube raiſins; which are diſtinguiſhed from the others by their ſize and figures: theſe are flat and wrinkled on the ſurface, ſoft and juicy within, and near an inch long, and when freſh and growing on the bunch, are of the ſize and ſhape of a large olive.

The raiſins of the ſun, and jar-raiſins, are all dried by the heat of the ſun, and theſe are the ſorts uſed in medicine. However, all the kinds have much the ſame virtues; they are all nutritive and balſamic; they are allowed to be attenuant, are ſaid to be good in nephritic complaints, and are an ingredient in pectoral decoctions, in which caſes, as alſo in all

others where aſtringency is not required of them, they ſhould have the ſtones carefully taken out.

Raiſins, on being imported, pay the following duties: large raiſins, the hundred weight, 11s. $8\frac{17\frac{1}{2}}{100}$d. and on exportation, draw back, 10s. $11\frac{62\frac{1}{2}}{100}$d. Raiſins of the ſun, the hundred weight pay, on importation, 14s. $\frac{90}{100}$d. and on exportation, draw back, 13s. $1\frac{1}{2}$d. Of Lipra or Belvidera, the hundred weight pay, on importation, 7s. $1\frac{59\frac{1}{2}}{100}$d. and on exportation, draw back, 6s. $10\frac{46\frac{1}{2}}{100}$d. Of Smyrna, either black or red, the hundred weight pay, on importation, 9s. $3\frac{45}{100}$d. and, on exportation, draw back, 8s. $9\frac{3}{4}$d. Of Alicant, Denia, and other raiſins, not otherwiſe rated, the hundred weight pay, on importation, 6s. $10\frac{72\frac{1}{2}}{100}$d. and, on exportation, draw back, 6s. $7\frac{87\frac{1}{2}}{100}$d. More, if in a foreign bottom, for every 20s. value of the above rates, 3s.

RAITING, or RATING, the laying of flax, hemp, timber, *&c.* when green, in a pond or running water, to ſeaſon, and prepare it for future uſes.

RAKE *of a ſhip* is all that part of her hull which hangs over both ends of her keel. That which is before, is called the fore-rake, or rake-forward; and that part which is at the ſetting on of the ſtern-poſt, is called the rake-aft, or afterward.

RAKE *of the rudder*, is the hindermoſt part of it.

RAKE, among hunters, the ſame with rag. See the article RAG.

RAKE, in mining, the ſame with vein. See the article VEIN.

RAKEE, in falconry, a term applied to a hawk that flies out too far from the fowl.

RAKING, of an horſe, is drawing the ordure with the hand out of the fundament, when he is coſtive, and cannot dung: in doing which the hand ſhould be anointed with butter or ſallad-oil.

An horſe is alſo ſaid to rake, when being ſhoulder-ſplaid, or having ſtrained his fore-quarters, he goes ſo lame as to drag one of his fore-legs in a ſemi-circle.

RAKING TABLE, or RAKED TABLE, among architects, is a member hollowed in the ſquare of a pedeſtal, *&c.* See the articles CAVETTO and SCOTIA.

RALLYING, in war, reaſſembling or calling together troops broken and put to flight.

RAM, in zoology, the male of the ſheep kind. See the article SHEEP.

RAM, in aſtronomy, the ſame with aries. See the article ARIES.

Battering RAM, in antiquity, a military engine uſed to batter and beat down the walls of places beſieged.

The battering ram was of two ſorts, the one rude and plain, the other compound. The former ſeems to have been no more than a great beam which the ſoldiers bore on their arms and ſhoulders, and with one end of it by main force aſſailed the wall. The compound ram is thus deſcribed by Joſephus: it is a vaſt beam, like the maſt of a ſhip, ſtrengthened at one end with a head of iron, ſomething reſembling that of a ram, whence it took its name. See plate CCXXVII. fig. 1. This was hung by the middle with ropes to another beam, which lay acroſs two poſts; and hanging thus equally ballanced, it was by a great number of men drawn backwards and puſhed forwards, ſtriking the wall with its iron-head.

Plutarch informs us, that Mark Anthony, in the Parthian war, made uſe of a ram fourſcore feet long: and Vitruvius tells us, that they were ſometimes an hundred and ſix, and ſometimes an hundred and twenty feet in length; and to this perhaps, the force and ſtrength of the engine was in a great meaſure owing. The ram was managed at one time by a whole century of ſoldiers, and they being ſpent, were ſeconded by another century, ſo that it played continually without any intermiſſion.

In order to calculate the force of the battering-ram, R, (plate CCXXVII. fig. 1.) ſuppoſe it to be 28 inches in diameter, and 180 feet long; and conſequently its ſolid content 750 cubic feet; which, allowing 50 pounds for each foot, will weigh 37500 pounds: and ſuppoſe its head of caſt-iron, together with three iron-hoops, *&c.* to be 3612 pounds. Now all theſe weights, added together, make 41112 pounds, equal the weight of the whole ram; which will require 1000 men to move it, ſo as to cauſe it to ſtrike againſt the point L of the wall AHIGE, each man moving a weight of 41 pounds. The quantity of motion produced by this action, when the ram moves one foot in a ſecond,

Fig. 1. The Battering RAM.

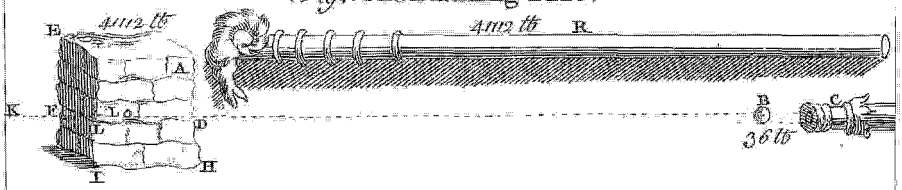


Fig. 2 RAGULED. Fig 3 RAMPANT.

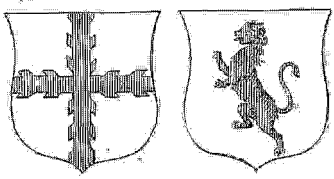


Fig. 4. RANA PISCATRIX.

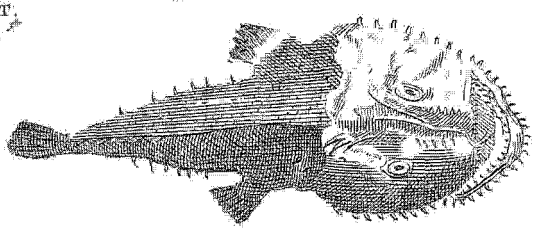
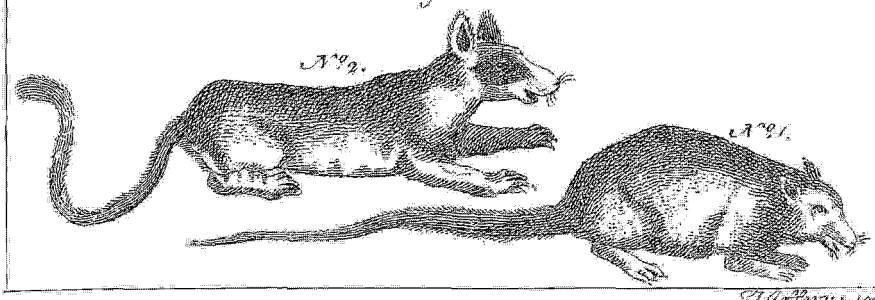


Fig. 5. RANUNCULUS.

Fig. 6. RATS.



a ſecond, may be expreſſed by the number 41112; which motion or force compared with the quantity of motion in the iron-ball B, ſhot out of the cannon C, will be found equal to it: for a cannon-ball is known to move as faſt as ſound for about the ſpace of a mile; and if you multiply 36 pounds, the weight of the ball, by 1142, the number of feet which ſound moves in one ſecond, you will have the number 41112 for the quantity of motion or force, in the ball B ſtriking at L. And if, after a few ſtrokes given by the battering-ram, the mortar or cement is ſo looſened, that the piece of the wall ADDFE is at laſt by a ſtroke of the ram carried forward from F to K, and ſo beaten down; the ſame thing will be performed by a cannon-ball, after an equal number of ſtrokes.

This ſhews how advantageous the invention of gunpowder is; ſince we are thereby enabled to give ſuch a prodigious velocity to a ſmall body, that it ſhall have as great a quantity of motion as a body immenſely greater, and requiring vaſtly more hands to work it: for three men will manage a cannon, which ſhall do as much execution as the above battering-ram wrought by 1000. The ram, whoſe force is here calculated, is taken at a mean; being bigger than ſome, and leſs than others, of thoſe uſed by the antients.

RAM's HEAD, in a ſhip, is a great block belonging to the fore and main-halliards. It has three ſhivers in it, into which the halliards are put, and in a hole at the end of it are reeved the ties.

RAMADAN, a ſolemn ſeaſon of faſting among the mahometans, kept in the ninth month of the arabic year. This faſt conſiſts in abſtaining from meat and drink, and from lying with their wives each day, from the riſing of the ſun till the ſtars appear; and is of ſuch ſtrict obligation, that none is excuſed from it; for the ſick, and all others who cannot obſerve it in this month, are obliged to faſt another entire month inſtead of it. So ſuperſtitious are the mahometans in the obſervance of this lent, that they dare not waſh their mouths, or even ſwallow their ſpittle. The men are, indeed, allowed to bathe themſelves, on condition they do not plunge the head under water, leſt ſome drops enter by the mouth or ears, &c. but as for the women, they are ſtrictly forbid bathing, for fear of taking in water at the pudendum. However, they frequently feaſt all night. The mahometans call this month holy, and believe, that as long as it laſts, the gates of paradiſe are open, and thoſe of hell ſhut.

RAMAGE, the boughs or branches of trees.

RAMAGE-FALCON, or HAWK, one that is wild and coy, as having been long amongſt the boughs preying for itſelf. All falcons retain this name when they have left the aery; being ſo called in May, June, July and Auguſt. Theſe are very rarely reclaimed.

RAMAGE-VELVET. See VELVET.

RAMBERVILLERS, a city of Germany, in the dutchy of Lorrain: eaſt long. 6° 30′, north lat. 48° 20′.

RAMEKINS, a fortreſs of Zeland, one of the United Provinces, ſituated five miles ſouth of Middleburg.

RAMERA, a town of France, in the province of Champain, eighteen miles north-eaſt of Troyes.

RAMIFICATION, the production of boughs or branches, or of figures reſembling branches.

RAMILLIES, a ſmall town of the auſtrian Netherlands, in the province of Brabant, ten miles north of Namur.

RAMMER, an inſtrument uſed for driving down ſtones or piles into the ground; or for beating the earth, in order to render it more ſolid for a foundation.

RAMMER *of a gun*, the gun-ſtick; a rod uſed in charging of a gun, to drive home the powder, as alſo the ſhot and the wad, which keeps the ſhot from rolling out. The rammer of a great gun is uſed for the ſame purpoſe. It has a round piece of wood at one end, and the other is uſually rolled in a piece of ſheep-ſkin, fitted to the bore of the piece, and is uſed to clear her after ſhe has been diſcharged, which is called ſponging the piece.

RAMPANT, in heraldry, a term applied to a lion, leopard, or other beaſt that ſtands on his hind legs, and rears up his fore feet in the poſture of climbing, ſhewing only half his face, as one eye, &c. It is different from ſaliant, in which the beaſt ſeems ſpringing forward as if making a ſally. See plate CCXXVII. fig. 3.

RAMPART, in fortification, is an elevation of earth round a place capable of reſiſting the cannon of an enemy; and formed into baſtions, curtins, &c. See FORTIFICATION, BASTION, &c.

A ram-

A rampart ought to be ſloped on both ſides, and to be broad enough to allow room for the marching of waggons and cannon, beſide that allowed for the parapet which is raiſed on it: its thickneſs is generally about ten or twelve fathom, and its height not above three, which is ſufficient to cover the houſes from the battery of the cannon. The rampart is encompaſſed with a ditch, and is ſometimes lined or fortified on the inſide, otherwiſe it has a berme. See the article BERME.

Upon the rampart ſoldiers continually keep guard, and pieces of artillery are planted there for the defence of the place.

RAMPART, in civil architecture, is uſed for the ſpace left between the wall of a city, and the next houſes.

RAMSEY, a market town of Huntingtonſhire, ten miles north-eaſt of Huntington.

RAMSEY, an iſland in the iriſh channel, on the coaſt of Pembrokeſhire: weſt long. 5° 20′, north lat. 51° 55′.

RAMSGATE, a port-town of Kent, ſituated between the north and ſouth Foreland, eight miles ſouth-eaſt of Canterbury.

RAMPHASTOS, in ornithology, a genus of birds, of the order of the picæ, the beak of which is remarkably large, and without any viſible noſtrils: the toes are the ſame in number and the ſame way placed as in the parrot. See PARROT.

This genus comprehends the toucan, the pepper-bird, and ſeveral other ſpecies. See the articles TOUCAN, *&c.*

RAMUS, in general, denotes a branch of any thing, as of a tree, an artery, vein, *&c.*

RANA, the FROG, in zoology. See the article FROG.

RANA PISCATRIX, the FROG-FISH, in ichthyology, a fiſh of a very irregular figure, not unlike that of a tadpole; its body being very inconſiderable in proportion to the vaſt ſize of its head, which has a very large mouth furniſhed with ſharp teeth, and ſurrounded with fleſhy tubercles; and on the under part of the body there are two fins reſembling a mole's feet. See plate CCXXVII. fig. 4. It is the ſame with the lophius. See the article LOPHIUS.

RANA, or RANULA. See RANULA.

RANCHIERA, a port-town of Terra Firma, ſituated in weſt long. 72°, north lat. 11° 34′.

RANCID, denotes a fatty ſubſtance that is become rank or muſty; or has contracted an ill ſmell by being kept cloſe.

RANDIA, a genus of plants, the claſs of which is not yet fully aſcertained: its flower is monopetalous, and of the ſhape of a ſaucer; the limb is divided into five ſegments: the fruit is an oval, unilocular capſule, containing numerous compreſſed ſeeds, ſurrounded with a pulp.

RANDOM SHOT, in gunnery, is a ſhot made when the muzzle of a gun is raiſed above the horizontal line, and is not deſigned to ſhoot directly, or point-blank. The utmoſt random of any piece is about ten times as far as the bullet will go point-blank. The bullet will go fartheſt when the piece is mounted to about 45° above the level range. See GUNNERY.

RANFORCE RING. See RE-IN-FORCED-RING.

RANGE, in gunnery, the path of a bullet, or the line it deſcribes from the mouth of the piece to the point where it lodges. If the piece lie in a line parallel to the horizon, it is called the right or level range: if it be mounted to 45°, it is ſaid to have the utmoſt range, all others between 00 and 45° are called the intermediate ranges.

RANGER, a ſworn officer of a foreſt, appointed by the king's letters-patent, whoſe buſineſs is to walk through his charge, to drive back the deer out of the purlieus, *&c.* and to preſent all treſpaſſes within his juriſdiction at the next foreſt-court.

RANGES, in a ſhip, two pieces of timber that go acroſs from ſide to ſide; the one on the fore-caſtle, a little abaft the foremaſt, and the other in the beak-head, before the wouldings of the bow-ſprit.

RANGIFER, the REIN-DEER. See the article REIN.

RANGING, in war, diſpoſing the troops in the order proper for an engagement, or for marching.

RANGING, in building, ſignifies running ſtrait, when the ſides of a work do not break into angles.

RANINE VEINS. See RANULARES.

RANK, the order or place allotted a perſon, ſuitable to his quality or merit.

RANK, in war, is a row of ſoldiers, placed ſide by ſide.

To double the ranks, is to put two ranks into one. To cloſe the ranks, is to bring the men nearer: and to open them, is to ſet them farther apart.

RANSOM,

RANSOM, a ſum of money paid for the redemption of a ſlave, or for the liberty of a priſoner of war. In our law-books, ranſom is alſo uſed for a ſum paid for the pardon of ſome great offence, and to obtain the offender's liberty.

RANT, in the drama, an extravagant, unnatural, and improbable flight of paſſion.

RANULA, or RANA, in medicine, a tumour under the tongue, which like a ligature hinders a child from ſpeaking or ſucking.

The matter contained in theſe tumours is various, it being ſometimes a tenacious and mucous lymph, ſometimes a thick and purulent matter, and ſometimes of a hard and ſtony conſiſtence. The ſafeſt method of cure, according to Heiſter, is to turn the tongue upwards, and to make a tranſverſe inciſion through the tumour, in order to diſcharge the included matter; after which you may deterge or deſtroy the remaining tunic with honey of roſes ſharpened with ſpirits of vitriol, and then the cure may be eaſily completed with a mixture of oil and ſugar. Sometimes the tubercle breaks of itſelf, and then you muſt deterge and heal the ulcer as before.

RANUNCULUS, CROWFOOT, in botany, a genus of the *polyandria-polygnia* claſs of plants, the flower of which conſiſts of five obtuſe petals: there is no pericarpium; the ſeeds, which are numerous, being connected to the receptacle, by means of very ſhort peduncles. See plate CCXXVII. fig. 5.

This genus comprehends the ficaria, ranunculus, and ranunculoides of authors: there are a great many ſpecies of it in our meadow and paſture grounds, where they remain after the paſture is grazed; becauſe being very acrid, the cattle never eat them, otherwiſe they would bliſter their mouths and throats.

RANULARES, or RANINE VEINS, in anatomy, two veins under the apex of the tongue, which ariſe from the internal jugular, and run on either ſide the linea mediana. See the article TONGUE.

RAOLCONDA, a city of the hither India, ſituated in the province of Golconda: eaſt long. 79°, north lat. 17° 12′.

RAPACIOUS ANIMALS, are ſuch as live upon prey.

The characteriſtic marks of rapacious birds are, that they have a large head and a ſhort neck, hooked, ſtrong, and ſharp-pointed talons, a ſharp ſight, a membranous ſtomach, and not a muſculous one, or a gizzard like birds that live on grain.

RAPA, RAPE, in botany, is made by Linnæus a ſpecies of braſſica.

RAPE, in law, the having carnal knowledge of a woman by force and againſt her will. By ſtatute, whoever carnally knows a female child under ten years of age, ſhall ſuffer as a felon; and here it does not ſignify whether ſuch child conſented, or was forced; it is only to be proved that the offender entered her body; the crime itſelf conſiſts in penetration and emiſſion but where there is neither of theſe, an attempt to raviſh, be it never ſo outrageous, is deemed only an aſſault. In caſe a woman conceives, it is held to be no rape, from an opinion, that ſhe cannot conceive unleſs ſhe conſent. However, it is no excuſe that a woman at laſt yielded to the violence and conſented, if her conſent was extorted by the fear of death and impriſonment. However, it is a ſtrong preſumption againſt the woman, if ſhe make no complaint within forty days after the injury, which is the time allowed by law. A woman who has been raviſhed may proſecute, and likewiſe be a witneſs in her own cauſe: but it is remarked by chief juſtice Hales, that how far the woman's teſtimony is to be believed, muſt be entirely left to the jury on the trial; it being more or leſs credible according to the circumſtances of the fact. The aiders and abetters in the commiſſion of a rape are indictable as principals, and are guilty of felony without benefit of clergy. Antiently this crime was not deemed felony; but it was puniſhed with the loſs of the offenders eyes and privy members.

The civilians make another kind of rape, called rape of ſubornation or ſeduction; which is ſeducing a maid either to uncleanneſs or marriage, and that by gentle means, provided there be a conſiderable diſparity in the age and circumſtances of the parties. See the article RAVISHMENT.

RAPE *of the foreſt*, a treſpaſs commited in a foreſt by violence. See FOREST.

RAPE is alſo a name given to a diviſion of a county, and ſometimes means the ſame as a hundred, and at other times ſignifies a diviſion conſiſting of ſeveral hundreds; thus Suſſex is divided into ſix rapes, every one of which, beſides its hundreds, has a caſtle, a river, and a foreſt belonging to it. The like parts

in

in other counties are called tithings, lathes, or wapentakes.

RAPE alſo ſignifies the ſtalks of the cluſters of grapes when dried, and freed from the fruit. This is uſed in making vinegar. See the article VINEGAR.

RAPE-SEED, the ſeed of a plant deſcribed by authors under the name of napus ſylveſtris and bunias ſylveſtris. See the article NAPUS.

Rape-ſeed is cultivated to great advantage in ſeveral counties in England, particularly in Lincolnſhire, and conſiderable quantities of it are brought from Holland. From this ſeed is drawn an oil called rape-oil, which is uſed in the woollen manufacture, and in the materia medica is eſteemed attenuant, cordial, and ſudorific.

Rape-ſeed, on being imported, pays a duty of 5l. 13s. 6d. the laſt, containing ten quarters; and draws back, on exportation, 5l. 8s. 9d.

RAPHANUS, the RADISH, in botany, a genus of the *tetradynamia* claſs of plants, the flower of which conſiſts of four leaves diſpoſed in the form of a croſs: its fruit is a pod, containing ſeveral roundiſh and ſmooth ſeeds.

Radiſhes are attenuant, and good in ſcurvies and other diſorders proceeding from viſcidities of the juices, and other obſtructions of the glands.

RAPHIDIA, in zoology, a genus of four-winged inſects of the neuroptera order; the head of which is of a horny ſubſtance, and depreſſed; and its tail is armed with a ſlender horny weapon, not bifid at the extremity: it is about the ſize of the ſcorpion fly, and is common in meadows in July.

RAPIER, formerly ſignified a long, old-faſhioned broad ſword, ſuch as thoſe worn by the common ſoldiers: but it now denotes a ſmall ſword, as contradiſtinguiſhed from a back-ſword.

RAPINE, in law, taking away another's goods, *&c.* openly and by violence.

RAPISTRUM, in botany, the ſame with crambe. See the article CRAMBE.

RAPOLLA, a town of Italy, in the kingdom of Naples, ſixty-ſix miles eaſt of Naples.

RAPPAHANOCK, a large navigable river which riſes in the mountains weſt of Virginia, and diſcharges itſelf into the bay of Cheſepeak.

RAPPERSWEIT, a town of Switzerland, in the canton of Zurich, ſeventeen miles ſouth-eaſt of the city of Zurich.

RAPSODY. See RHAPSODY.

RAPTU HÆREDIS, an antient writ which lay at common law, for taking away an heir that held land in ſockage. See the article RAVISHMENT.

RAPTURE, an extaſy, or tranſport of mind. See EXTASY, ENTHUSIASM, *&c.*

RAPUNCULUS, in botany, a plant otherwiſe called pytheuma. See PYTHEUMA.

RAPUNTIUM, a plant called alſo lobelia. See the article LOBELIA.

RARE, in phyſics, ſtands oppoſed to denſe, and denotes a body that is very porous, whoſe parts are at a great diſtance from one another, and which contains but little matter under a large bulk. See the following article.

RAREFACTION, *rarefactio*, in phyſics, the act whereby a body is rendered rare; that is, brought to poſſeſs more room, or appear under a larger bulk without acceſſion of any new matter.

Rarefaction is oppoſed to condenſation. See CONDENSATION, COMPRESSION, and DENSITY.

Rarefaction is moſt properly reſtrained to that expanſion of a maſs into a larger bulk, which is effected by heat. All expanſion from other cauſes they call dilatation. See EXPANSION, DILATATION, and FIRE.

It is by rarefaction that gunpowder has its effect, and to the ſame principle alſo we owe our æolipiles, thermometers, *&c.* The degree to which the air is rarifiable, exceeds all imagination; ſuch is the rarefaction of common air from its own principle of elaſticity, and without any previous condenſation, that Mr. Boyle found it to dilate itſelf ſo as to take up 13679 times its former ſpace; and when compreſſed, the ſame author found its greateſt ſpace when moſt rarified, to its leaſt when moſt condenſed, as 55000 to 1. See AIR and ATMOSPHERE.

Such an immenſe rarefaction, Sir Iſaac Newton ſhews is inconceivable on any other principle than that of a repelling force inherent in the air, whereby its particles mutually fly from one another. This repelling force, he obſerves, is much more conſiderable in air than in other bodies, as being generated from the moſt fixed bodies, and that with much difficulty, and ſcarce without fermentation; thoſe principles being always found to fly each other with the moſt force, which, when in contact, cohere the moſt firmly. M. Mariotte eſtabliſhed this as a principle, from experiments, that the different

ent rarefactions or condenſations of the air, follow the proportion of the weights wherewith it is preſſed. Hence, ſuppoſing the mercury in the level of the ſea ſuſpended to 28 inches, which is the weight of the whole atmoſphere; and that 60 feet height of air are equivalent to a line or $\frac{1}{12}$ of an inch of mercury, ſo that the barometer at the height of 60 feet from the ſea, would fall a line. It is eaſy finding what height of air would be equal to a ſecond, or any other line of mercury; for, as 28 inches of mercury $\frac{1}{12}$ are to 28 inches, ſo is the height of 60 feet of air to a fourth term, which is the height of air correſponding to a ſecond line of mercury. And after the ſame manner may the height of air correſponding to each line be found, which will make a geometrical progreſſion, the ſum whereof will be the whole height of the atmoſphere, and of conſequence a certain part of that ſum will be the height of a mountain, at whoſe top the barometer ſhall have ſunk a certain quantity. See the article BAROMETER.

Meſſ. Caſſini and Maraldi, upon meaſuring the heights of ſeveral mountains, found that this progreſſion of M. Mariotte was defective; that it always gave the height of the mountains, and conſequently the rarefactions, leſs than they really were; and from ſome farther experiments M. Amontons found, that the principles will only hold in the mean rarefactions, not the extremes. See the article MOUNTAIN.

The open air, in which we breathe, ſays Sir Iſaac Newton, is 8 or 900 times lighter than water, and by conſequence 8 or 900 times rarer. And ſince the air is compreſſed by the weight of the incumbent atmoſphere, and the denſity of the air is proportionable to the compreſſing force, it follows by computation, that at the height of about ſeven engliſh miles from the earth, the air is four times rarer than at the ſurface of the earth; and at the height of 14 miles, it is 16 times rarer than at the ſurface of the earth; and at the height of 21, 28, or 35 miles, it is reſpectively 64, 256, or 1024 times rarer, or thereabouts; and at the height of 70, 140, and 210 miles, it is about 1000000, 1000000000000, or 1000000000000000000, &c.

Mr. Cotes has found, from experiments made with a thermometer, that linſeed-oil is rarified in the proportion of 40 to 39 in the heat of the human body; in that of 15 to 14, in that degree of heat wherein water is made to boil; in the proportion of 15 to 13, in that degree of heat wherein melted tin begins to harden; and, finally, in the proportion of 23 to 20, in that degree wherein melted tin arrives at a perfect ſolidity. The ſame author diſcovered, that the rarefaction of the air in the ſame degree of heat is ten times greater than that of the linſeed-oil; and the rarefaction of the oil, about fifteen times greater than that of the ſpirit of wine.

RAREFACTIVES, in medicine, remedies which open and enlarge the pores of the ſkin, to give an eaſy vent to the matter of perſpiration: or ſuch medicines as rarify the blood, as aniſe, mallows, pellitory, chamomile-flowers, linſeed, &c.

RASANT, or RAZANT, in fortification. Raſant-flank, or line, is that part of the curtin or flank whence the ſhot exploded raſe, or glance, along the ſurface of the oppoſite baſtion.

RASEBURG, a port-town of Sweden, in the province of Finland, and territory of Nyland, ſituated on the gulph of Finland: eaſt long. 23°, north lat. 60° 22′.

RASEN, a market-town of Lincolnſhire, ſituated twelve miles north-eaſt of Lincoln.

RASH, in medicine, an eruption upon the ſkin, thrown out in fevers or ſurfeits.

RASP, a rank ſort of file. See FILE.

RASTAT, the name of two towns of Germany; one in the circle of Bavaria, and archbiſhopric of Saltzburg, ſituated on the river Ens, thirty-five miles ſouth of the city Ens; another in the circle of Swabia, and marquiſate of Baden, ſituated on the eaſt ſide of the river Rhine, twenty-one miles ſouth-weſt of Philipſburg.

RAT, in zoology, the engliſh name of ſeveral ſpecies of the mus-kind; as the common-rat, the ground-rat, and the water-rat. See plate CCXXVII. fig. 6. where n° 1. repreſents the common, and n° 2. the ground-rat.

The common rat is a quadruped too well known to need much deſcription. It is of a browniſh-grey colour, with a long and almoſt naked tail. It greatly reſembles the common mouſe in form, but it is at leaſt five times as large: the tail is divided into more than an hundred and fifty annular joints.

The ground-rat is nearly of the ſize of the common rat, only that its tail is much ſhorter, as well as more hairy.

The water-rat is considerably larger than the common kind: its tail is all the way of the same thickness, and is abrupt at the end: its legs are shorter than those of the common rat, but its feet are longer, and the toes connected by membranes.

Norway-RAT. See NORWAY.

RAT-TAILS, or ARRESTS, in the manege, signify hard callous swellings upon the hinder legs under the hough, running along the sinew.

A horse is called rat-tail, when he has no hair upon his tail.

RATAFIA, a fine spirituous liquor, prepared from the kernels, *&c.* of several kinds of fruit, particularly of cherries, and apricots.

Ratafia of cherries is prepared by bruising the cherries, and putting them into a vessel wherein brandy has been long kept; then adding to them the kernels of cherries, with strawberries, sugar, cinnamon, white pepper, nutmegs, cloves; and to twenty pound of cherries, ten quarts of brandy. The vessel is left open ten or twelve days, and then stopped close for two months before it be tapped.

Ratafia of apricots is prepared two ways, *viz.* either by boiling the apricots in white wine, adding to the liquor an equal quantity of brandy with sugar, cinnamon, mace, and the kernels of apricots; infusing the whole for eight or ten days; then straining the liquor, and putting it up for use: or else by infusing the apricots cut in pieces in brandy, for a day or two, passing it through a straining bag, and then putting in the usual ingredients.

RATCH, or RASH, in clock-work, a sort of wheel having twelve fangs, which serve to lift up the detents every hour, and make the clock strike. See CLOCK.

RATCHETS, in a watch, are the small teeth at the bottom of the fusy, or barrel, which stops it in winding up.

RATE, a standard or proportion, by which either the quantity or value of a thing is adjusted.

RATE-TYTHE, when sheep or other cattle are kept in a parish for less time than a year, the owner must pay tythe for them, *pro rata*, according to the custom of the place.

RATE *of a ship of war* is its order, degree, or distinction, as to magnitude, burden, *&c.* The rate is usually accounted by the length and breadth of the gun-deck, the number of tons, and the number of men and guns the vessel carries. Of these there are six rates. A first rate man of war has its gun-deck from 159 to 174 feet in length, and from 44 to 50 feet broad; it contains from 1313 to 1882 tons, has from 706 to 800 men, and carries from 96 to 100 guns. Second rate ships have their gun decks from 153 to 165 feet long, and from 41 to 46 broad; they contain from 1086 to 1482 tons, and carry from 524 to 640 men, and from 84 to 90 guns. Third rates have their gun decks from 140 to 158 feet in length, from 37 to 42 feet broad; they contain from 871 to 1262 tons; carry from 389 to 476 men, and from 64 to 80 guns. Fourth rates are in length on the gun decks from 118 to 146 feet, and from 29 to 38 broad, they contain from 448 to 915 tons; carry from 226 to 346 men, and from 48 to 60 guns. Fifth rates have their gun decks from 100 to 120 feet long, and from 24 to 31 broad; they contain from 259 to 542 tons, and carry from 145 to 190 men, and from 26 to 44 guns. Sixth rates have their gun decks from 87 to 95 feet long, and from 22 to 25 broad; they contain from 152 to 256 tons, carry from 50 to 110 men, and from 16 to 24 guns.

It is to be observed, that the new-built ships are much larger, as well as better, than the old ones of the same rate; whence the double numbers all along: the larger of which express the proportions of the new-built ships, as the less those of the old ones. See the articles SHIP and NAVY.

RATEEN, or RATTEN, in commerce, a thick woolen stuff, quilled, woven on a loom with four treddles, like serges, and other stuffs, that have the whale or quilling. There are some rateens dressed and prepared like cloths; others left simply in the hair, and others where the hair or knap is frized. Rateens are chiefly manufactured in France, Holland, and Italy, and are mostly used in linings. The frize is a sort of coarse rateen, and the drugget is a rateen half linen, half woolen.

RATIFICATION, *ratificatio*, an act approving of, and confirming something done by another in our name.

This word is particularly used in our laws for the confirmation of a clerk in a benefice, prebend, *&c.* formerly given him by the bishop, *&c.* where the right of patronage is doubted to be in the king.

Rati-

Ratification is alſo uſed for an act confirming ſomething we ourſelves have done in our own name.

RATIO, in arithmetic and geometry, is that relation of homogeneous things which determines the quantity of one from the quantity of another, without the intervention of a third.

Two numbers, lines, or quantities, A and B, being propoſed, their relation one to another may be conſidered under one of theſe two heads: 1. How much A exceeds B, or B exceeds A; and this is found by taking A from B, or B from A, and is called arithmetic reaſon or ratio. 2. Or how many times, and parts of a time, A contains B, or B contains A; and this is called geometric reaſon or ratio; (or, as Euclid defines it, it is the mutual habitude, or reſpect, of two magnitudes of the ſame kind, according to quantity; that is, as to how often the one contains, or is contained, in the other) and is found by dividing A by B, or B by A; and here note, that that quantity which is referred to another quantity, is called the antecedent of the ratio; and that to which the other is referred, is called the conſequent of the ratio; as, in the ratio of A to B, A is the antecedent, and B the conſequent. Therefore any quantity, as antecedent, divided by any quantity as a conſequent, gives the ratio of that antecedent to the conſequent.

Thus the ratio of A to B is $\frac{A}{B}$, but the ratio of B to A is $\frac{B}{A}$; and, in numbers, the ratio of 12 to 4 is $\frac{12}{4}=3$, or triple; but the ratio of 4 to 12 is $\frac{4}{12}=\frac{1}{3}$, or ſubtriple.

And here note, that the quantities, thus compared, muſt be of the ſame kind; that is, ſuch, which, by multiplication, may be made to exceed one the other, or as theſe quantities are ſaid to have a ratio between them, which, being multiplied, may be made to exceed one another. Thus a line, how ſhort ſoever, may be multiplied, that is, produced ſo long as to exceed in length any given right line, and conſequently theſe may be compared together, and the ratio expreſſed; but as a line can never, by any multiplication whatever, be made to have breadth, that is, to be made equal to a ſuperficies, how ſmall ſoever; theſe can therefore never be compared together, and conſequently have no ratio or reſpect one to another, according to quantity; that is, as to how often the one contains, or is contained in the other. See the article PROPORTION.

RATIOCINATION, *ratiocinatio*, the act of reaſoning. See REASONING.

RATION, or RATIAN, in the army, a portion of ammunition, bread, drink, and forage, diſtributed to each ſoldier in the army, for his daily ſubſiſtence, &c. The horſe have rations of hay and oats when they cannot go out to forage. The rations of bread are regulated by weight. The ordinary ration of a foot ſoldier is a pound and a half of bread per day. The officers have ſeveral rations according to their quality and the number of attendants that they are obliged to keep. When the ration is augmented on occaſions of rejoicing, it is called a double ration. The ſhip's crews have alſo their rations or allowances of biſket, pulſe, and water, proportioned according to their ſtock.

RATIONABILES EXPENSÆ, *reaſonable expences*. The commons in parliament, as well as the proctors of the clergy, in convocation, were antiently allowed rationabiles expenſas; that is, ſuch allowance as the king, conſidering the prices of all things, ſhall judge meet to impoſe on the people, to pay for the ſubſiſtence of their repreſentatives.

RATIONABILI *parte bonorum*, in law, is a writ which lies for the widow againſt the executors of her deceaſed huſband, who deny to give her the third part of his goods after the debts and funeral charges are paid. It is obſerved, that by the common law of England, the goods of a deceaſed perſon, his debts being firſt paid, ſhall be divided into three equal parts, and go to the wife, her children, and executors; wherefore this writ may be brought by the children as well as the widow. But it has been held that the writ only lies where the cuſtom of the country warrants it.

RATIONABILIBUS *diviſis*, in law, a writ that is brought where there are two lords in different towns, who have ſignories adjoining together, and one of them finds his waſte by little and little to have been incroached upon; then the lord on whoſe ground the incroachment was made ſhall have this writ againſt the other

to rectify the bounds and divisions. In which respect it is said by Fitzherbert, to be in its nature a writ of right.

RATIONAL, *reasonable*. See REASON.

RATIONAL is also applied to integral, fractional, and mixt numbers: thus we say rational fraction, rational integer, and rational mixt number, for the explanation and doctrine of which, see NUMBER and FRACTION.

Rational is applied to the true horizon, in opposition to the sensible or apparent one. See HORIZON.

Rational is also applied to quantity, ratio, &c. See QUANTITY, RATIO, &c.

RATIONALE, a solution, or account of the principles of some opinion, action, hypothesis, phænomenon, or the like. See the articles PRINCIPLE, PHÆNOMENON, &c.

Hence rationale is the title of several books.

RATIONALE is also the latin name for an antient sacerdotal vestment, worn by the high priest, under the old law, being a piece of embroidered stuff, worn on the breast, about a span square. A rationale appears to have been antiently worn by the bishops, under the new law: but authors are in doubt about its form; some having it to resemble that of the Jews; others taking it to be only the pallium. See the article PALLIUM.

RATIONIS OS, in anatomy, a term sometimes used for the os frontis. See the article FRONTIS OS.

RATIPOR, a town of Bohemia, in the dutchy of Silesia, situated on the river Oder, sixteen miles north-east of Troppaw.

RATIPOR is also a city of hither India, capital of the province of Malva, situated east long. 80°, north lat. 25°.

RATISBON, a city of Germany, in the circle of Bavaria, situated at the confluence of the rivers Danube and Regen, in east long. 12° 5′, north lat. 49°. This is a free imperial city, and here the assembly or diet of the states of the empire meets. See the article DIET.

RATLINES, or as the seamen call them, RATLINS, those lines which make the ladder steps to get up the shrouds and puttocks, hence called the ratlings of the shrouds.

RATTLE, among the antients, a musical instrument of the pulsative kind, called by the Romans crepitaculum. The tintinnabulum, crotalum, and sistrum, were by the same esteemed only so many different kinds of rattles. See the articles BELL, CROTALUM, and SISTRUM.

What we commonly call rattles now, is no more than a stick of wax in a silver handle, to which is suspended a number of little bells of the same, or some other metal, serving in the hands of children to make a rattling or tinkling noise, or otherwise to play withal.

Rattles for children the groce, containing twelve dozen, pay, on importation, 1s. $1\frac{86}{100}$d. and, on exportation, draw back 1s. $\frac{15}{100}$d.

RATTLE-SNAKE, *crotalophorus*, in zoology, a genus of serpents, having scuta that cover the whole under-surface of the body and tail, and having the extremity of the body terminated by a kind of rattle, formed of a series of urceolated articulations, which are moveable, and make a noise. See plate CCXXVIII. fig. 1.

Of this serpent, there are two species, the greater one with the scuta of the abdomen a hundred and seventy-two, of the tail twenty-one; and the lesser rattle-snake, having the scuta of the abdomen a hundred and sixty-five, of the tail twenty-eight. The larger is a very terrible, and at its full growth, a very large serpent, growing to eight feet in length, with a proportionable thickness: the head is large, broad, depressed, and of a pale brown: the iris of the eye is red; the back is of a brown colour, with an admixture of a ruddy yellow, and variegated with a great many irregular transverse lists, of a deep black: the belly is of a palish blue; the rattle is of a firm, and as it were of a horny substance, and brown colour, composed of a number of cells, which are articulated one within another, which articulations being very loose, the included points strike against the inner surface of the rings they are admitted into, and makes that rattling noise, when the serpent vibrates, or shakes its tail. This serpent is frequent in the woods of America: the bite is fatal, but it is easy to avoid it, the creature being sluggish, moving slowly, never attacking a man unless provoked, and giving notice before it bites by shaking its rattle.

The lesser species of this serpent grows to about seven feet in length, and in most particulars is like the former one, and its bite is equally mischievous.

RATTLE-SNAKE-ROOT, the ſame with the ſenega, a ſpecies of polygala. See the article POLYGALA.

RAVA, a city of Great Poland, capital of the Palatinate of Rava, ſituated fifty miles ſouth-eaſt of Warſaw.

RAUCEDO, *hoarſeneſs*, in medicine. See the article HOARSENESS.

RAVELIN, in fortification, was antiently a flat baſtion, placed in the middle of a curtin; but now a detached work compoſed only of two faces, which make a ſaliant angle, without any flanks, and raiſed before the curtin on the counterſcarp of the place. A ravelin is a triangular work, reſembling the point of a baſtion, with the flanks cut off. See the article FORTIFICATION.

Its uſe before a curtin is to cover the oppoſite flanks of the two next baſtions. It is uſed alſo to cover a bridge, or a gate, and is always placed without the moat. There are alſo double ravelins that ſerve to cover each other: they are ſaid to be double, when they are joined by a curtin. See CURTIN.

RAVEN, in ornithology, a ſpecies of the corvus, of the bigneſs of a common hen, of a black colour, with a blue back: the head is ſmall, depreſſed on the crown, and flatted at both ſides: the eyes are large, bright and piercing; the beak is conſiderably long and thick, and ſomewhat ridged on the back, and ſharp at the point. See CORVUS.

RAVENGLAS, a port-town of Cumberland, ſituated on the Iriſh Channel, thirty-eight miles ſouth-weſt of Carliſle.

RAVENNA, a city of Italy, in the pope's territories, capital of the province of Romania, ſituated eaſt long. 13° north lat. 44° 30′.

RAVISHMENT, in law, denotes an unlawful ſeducing either of a woman, or an heir that is in ward: ſometimes it is alſo uſed in the ſame ſenſe as a rape. See the article RAPE.

RAVISHMENT *de garde*, in law, was a writ that formerly lay for the guardian by knight's ſervice, or in ſocage, againſt a perſon who took from him the body of his ward.

RAUVOLFIA, in botany, a genus of the *pentandria-monogynia* claſs of plants, the corolla of which conſiſts of a ſingle funnel-faſhioned petal, with a large limb, divided into five lanceolated ſegments: the fruit is a very large, roundiſh and fleſhy bilocular drupe, with a ſingle ovated nut in each cell.

RAY, in optics, a beam of light, emitted from a radiant, or luminous body. See the article LIGHT.

Rays are defined by Sir Iſaac Newton, to be the leaſt parts of light, whether ſucceſſive in the ſame line, or cotemporary in ſeveral lines. For that light conſiſts of parts of both kinds is evident, ſince one may ſtop what comes this moment in any point, and let paſs that which comes preſently after: now the leaſt light, or part of light, which may be thus ſtopped, he calls a ray of light.

A ray, or right line, drawn from the point of concourſe of the two optical axes, through the middle of the right line, which paſſes by the centers of the two pupils of the eyes, is by ſome called a common ray. See VISION.

As for direct, converging and diverging rays; rays of incidence, inflection, refraction, curvature, &c. See the articles DIRECT, CONVERGING, &c.

RAY-FISH, *raja*. See RAJA.

RAYLEIGH, a market-town of Eſſex, ten miles ſouth-eaſt of Chelmsford.

RAYONANT, or *Croſs* RAYONANT, in heraldry, one which has rays of glory behind it, darting out from the center to all the quarters of the eſcutcheon, as repreſented in plate CCXXVIII. fig. 2.

RAZANT, or RASANT. See the article RASANT.

RAZOR, a well-known inſtrument, uſed by ſurgeons, barbers, &c. for ſhaving off the hair from various parts of the body.

All razors are prohibited to be imported.

RAZOR-BILL, *alka*, in ornithology. See ALKA.

RAZOR-FISH, *dactylus*, a ſpecies of ſolen. See the article SOLEN.

RE, in grammar, an inſeparable particle added to the beginning of words, to double or otherwiſe modify their meaning; as in re-action, re-move, re-export, &c.

REACH, in the ſea-language, ſignifies the diſtance between any two points of land, lying nearly in a right line.

RE-ACTION, in phyſiology, the reſiſtance made by all bodies to the action or impulſe of others, that endeavour to change its ſtate whether of motion or reſt. See the articles ACTION and MOTION.

The cauſe of the re-action of bodies is no other than their inertia. See the article INERTIA.

READING,

READING, a borough-town in Berkſhire, ſituated forty miles weſt of London, near the confluence of the rivers Kennet and Thames; it ſends two members to parliament.

READINGS, or *various* READINGS, *variæ lectiones*, in criticiſm, are the different manner of reading the texts of authors in antient manuſcripts, where a diverſity has ariſen from the corruption of time, or the ignorance of copyiſts. A great part of the buſineſs of critics lies in ſettling the readings by confronting the various readings of the ſeveral manuſcripts, and conſidering the agreement of the words and ſenſe.

Readings are alſo uſed for a ſort of commentary or gloſs on a law, text, paſſage, or the like, to ſhew the ſenſe an author takes it in, and the application he conceives to be made of it.

RE-AFFORESTED, is where a foreſt, having been diſafforeſted, is again made a foreſt. See FOREST.

RE-AGGRAVATION, in the romiſh eccleſiaſtical law, the laſt monitory publiſhed after three admonitions, and before the laſt excommunication. Before they proceed to fulminate the laſt excommunication, they publiſh an aggravation, and a re-aggravation. See the article EXCOMMUNICATION.

REAL, *reale*, is applied to a being that actually exiſts, in which ſenſe it coincides with actual. See ACTUAL.

REAL, in law, is oppoſed to perſonal. See the article PERSONAL.

Thus real action is that whereby the plaintiff lays title to land, *&c.* See the article ACTION, *&c.*

REAL, or CHIAPA, a city of Mexico, in north America, capital of the province of Chiapa, ſituated weſt long. 97°, north lat. 17°.

REALEIO, a port town of Mexico, in the province of Nicaragua, ſituated on the bay of the Pacific Ocean, in weſt long. 91° 30′, north lat. 12°.

REALGAR, *riſigallum*, in the materia medica, a name whereby the ſandarach has been a long time known in the ſhops. It has been alſo attributed to the factitious red arſenic. See the articles SANDARACH, and ARSENIC.

REALISTS, *realiſtæ*, a ſect of ſchool philoſophers, formed in oppoſition to the nominaliſts. See NOMINALISTS.

Under the realiſts are included the ſcotiſts, thomiſts, and all excepting the followers of Ocham. Their diſtinguiſhing tenet is that univerſals are realities, and have an actual exiſtence out of an idea, or imagination; or, as they expreſs it in the ſchools, a *parte rei*; whereas the nominaliſts contend that they exiſt only in the mind, and are only ideas, or manners of conceiving things.

REALITY, *realitas*, in the ſchools, a diminutive of *res*, thing, firſt uſed by the ſcotiſts, to denote a thing which may exiſt of itſelf; or which has a full and abſolute being of itſelf, and is not conſidered as a part of any other.

REALM, *regnum*, a country which gives its head, or governor, the denomination of a king.

REALMONT, a town of France, in the province of Languedoc, ſituated thirty-two miles north-eaſt of Toulouſe.

REAR, a term frequently uſed in compoſition, to denote ſomething behind, or backwards, in reſpect of another, in oppoſition to van: thus, in a military ſenſe, it is uſed for the hind part of an army, in oppoſition to the front. For the rear-guard, rear-half files, rear-line, rear-rank, and rear-admiral. See GUARD, FILE, LINE, RANK, and ADMIRAL.

REASON, *ratio*, a faculty, or power, of the mind, whereby it diſtinguiſhes good from evil, truth from falſhood; whereby man is diſtinguiſhed from beaſts; and wherein it is evident he greatly ſurpaſſes them: or reaſon is that principle whereby, comparing ſeveral ideas together, we draw conſequences from the relations they are found to have. See the article REASONING.

Some define reaſon to be the comprehenſion of many principles which the mind ſucceſſively can conceive, and from which concluſions may be drawn. And others conceive reaſon as no other than the underſtanding itſelf conſidered as it diſcourſes. See UNDERSTANDING.

Reaſon, Mr. Locke obſerves, contains two diſtinct faculties of the mind, *viz.* ſagacity, whereby it finds intermediate ideas; and illation, whereby it ſo orders and diſpoſes of them, as to diſcover what connection there is in each link of the chain, whereby the extremes are held together; and thereby, as it were, draws into view the truth ſought for. Illation, or inference, conſiſts in nothing but the perception of the connection there is between the ideas in each ſtep of the deduction, whereby the mind comes to ſee either the agreement or diſagreement of any two ideas, as in demonſtration,

ſtration, in which it arrives at knowledge; or their probable connection, on which it gives or with-holds, its aſſent, as in opinion. See the articles DEMONSTRATION, KNOWLEDGE, &c.

Senſe and intuition reach but a little way, the greateſt part of our knowlege depends upon deductions and intermediate ideas. In thoſe caſes where we muſt take propoſitions for true, without being certain that they are ſo, we would need to find out, examine, and compare the grounds of their probability. In both caſes the faculty which finds out the means, and rightly applies them to diſcover certainty in the one, and probability in the other, is that which we call reaſon. In reaſon, therefore, we may conſider four degrees, firſt the diſcovering and finding out of proofs. See INVENTION.

Secondly, the regular and methodical diſpoſition of them, and laying them in ſuch order, as that their connection may be plainly perceived. See METHOD.

Thirdly, the perceiving of their connection. See JUDGMENT. And,

Fourthly, the making a right concluſion. See CONCLUSION.

Concerning reaſon, Mr. Locke thinks that ſyllogiſm, as was generally thought, is not the proper inſtrument of it, nor the uſefulleſt way of exerciſing this faculty. See SYLLOGISM.

Reaſon, though of very large extent, fails us in ſeveral inſtances, as firſt, where our ideas fail; ſecondly, it is often at a loſs, becauſe of the obſcurity, confuſion, or imperfection of the ideas it is employed about: thus, having no perfect idea of the leaſt extenſion of matter, nor of infinity, we are at a loſs about the diviſibility of matter. Thirdly, our reaſon is often at a ſtand, becauſe it perceives not thoſe ideas which would ſerve to ſhew the certain or probable agreement or diſagreement of any two other ideas. Fourthly, our reaſon is very often engaged in abſurdities, and difficulties, by proceeding upon falſe principles, which being followed, lead men into contradictions to themſelves and inconſiſtency in their own thoughts. Fifthly, dubious words, and uncertain ſigns, often puzzle men's reaſon, and bring them to a nonplus. Though the deducing one propoſition from another be a great part of reaſon, and that which it is uſually employed about, yet the principal act of ratiocination is the finding the agreement or diſagreement of two ideas one with another by the intervention of a third; as a man by a yard finds two houſes to be of the ſame length, which could not be brought together to meaſure their equality by juxta-poſition. Words have their conſequences as the ſigns of ſuch ideas; and things agree or diſagree with what they really are, but we obſerve it only by our ideas. Hence we may be able to form an idea of that ordinary diſtinction of things into thoſe that are according to, thoſe that are above, and thoſe contrary to, reaſon. Thoſe according to reaſon, are ſuch propoſitions whoſe truth we can diſcover by examining and tracing thoſe ideas we have from ſenſation and reflection, and by a natural deduction find to be true or probable. Above reaſon are ſuch propoſitions, whoſe truth or probability we cannot by reaſon derive from theſe principles. Contrary to reaſon are ſuch propoſitions as are inconſiſtent with, or irreconcileable to, our clear and diſtinct ideas. Thus the exiſtence of one God is according to reaſon; the exiſtence of more than one God, contrary to reaſon; and the reſurrection of the body after death, above reaſon. Above reaſon may be alſo taken in a double ſenſe, *viz.* above probability, or above certainty.

Reaſon, as contradiſtinguiſhed to faith, Mr. Locke takes to be the diſcovery of the certainty or probability of ſuch propoſitions or truths, as the mind arrives at, by deductions made from ſuch ideas, which it has got by the uſe of its natural faculties, *viz.* by ſenſation or reflection; whereas faith, on the other hand, is the aſcent to any propoſition upon the credit of the propoſer, as coming immediately from God, which we call revelation. See FAITH and REVELATION.

This uſe of the word reaſon our author takes to be very improper; faith, as has been already obſerved, being nothing elſe but a firm aſſent of the mind, which if regulated, as is our duty, cannot be afforded to any thing but upon good reaſon, and ſo cannot be oppoſite to it.

REASON is alſo taken in different other ſignifications; ſometimes it denotes true and clear principles; ſometimes it is taken for clear and fair deductions from theſe principles; and ſometimes for the cauſe, particularly the final cauſe.

REASONABLE AID was antiently a duty that the lord of the fee claimed of his tenants holding by knight's ſervice, or ſocage, towards marrying his daughter, or the making his eldeſt ſon a knight.

REASON-

REASONING, RATIOCINATION, the exercise of that faculty of the mind called reason; or it is an act or operation of the mind, deducing some unknown proposition from other previous ones that are evident and known. See REASON.

It often happens in the comparing ideas together, that their agreement or disagreement cannot be discerned at first view, especially if they are of such a nature as not to admit of an exact application to one another: here then, as has been already observed under REASON, it becomes necessary to look out after some third idea that will admit of such an application as the present case requires. Hence it appears that every act of reasoning necessarily includes three distinct judgments, two wherein the ideas whose relation we want to discover, are are severally compared with the middle idea, and a third wherein they are themselves connected, or disjoined according to the result of that comparison. Now, as our judgment when put into words are called propositions, so the expressions of our reasonings are termed syllogisms. And hence it follows that as every act of reasoning implies three several judgments, so every syllogism must include three distinct propositions. See the article SYLLOGISM.

In order therefore to infer a conclusion by a single act of reasoning, the premises must be intuitive propositions; where they are not, previous syllogisms are required, in which case reasoning becomes a complicated act taken in a variety of successive steps. This frequently happens in tracing the more remote relations of our ideas, where many middle terms being called in; the conclusion cannot be made out, but in consequence of a series of syllogisms following one another in train. Hence we may clearly perceive that reasoning, in the highest exercise of that faculty, is no more than an orderly combination of simple acts of reasoning. See DEMONSTRATION.

Thus we see that reasoning, beginning with first principles, rises gradually from one judgment to another, and connects them in such a manner that every stage of the progression brings intuitive certainty along with it.

All the aims of human reasoning may in the general be reduced to these two. 1. To rank things under those universal ideas to which they truly belong; and, 2. To ascribe to them their several attributes and properties in consequence of that distribution.

This first aim of reason then is to determine the genera and species of things; and the second end regards the sciences and the affairs of common life. See the articles GENUS, SPECIES, &c.

As in tracing the most distant relation of things we must always have recourse to intervening ideas, and are more or less successful in our researches, according to our acquaintance with those ideas, and ability of applying them, it is evident that to make a good reasoner two things are principally required; first an extensive knowledge of those intermediate ideas, by means of which things may be compared one with another; secondly, the skill and talent of applying them happily in all particular instances that come under consideration.

There is another species of reasoning with two propositions, which seems to be compleat in itself, and where we admit the conclusion without supposing any tacit or suppressed judgment in the mind from which it follows syllogistically. This happens between propositions where the connection is such that the admission of the one necessarily, and at the first sight, implies the admission also of the other: for if it falls out that the proposition on which the other depends is self evident, we content ourselves with barely affirming it, and infer that other by a direct conclusion: thus, by admitting an universal proposition we are forced also to admit of all the particular propositions comprehended under it; this being the very condition that constitutes a proposition universal. If then that universal proposition chances to be self evident, the particular ones follow of course, without any farther train of reasoning.

Another species of reasoning is that called by logicians induction; in order to the right understanding of which, it will be necessary to observe, that our general ideas are for the most part capable of various subdivisions: thus the idea of the lowest species may be subdivided into its several individuals; the idea of any genus into the different species it comprehends, and so of the rest. If then we suppose this distribution to be duly made, so as to take in the whole extent of the idea to which it belongs, then it is plain that all the subdivisions or parts of any idea taken together,

together conſtitute that whole idea: thus the ſeveral individuals of any ſpecies taken together conſtitute the whole ſpecies, and all the various ſpecies comprehended under any genus make up the whole genus; this being allowed, it is apparent that whatever may be affirmed of all the ſeveral ſubdiviſions and claſſes of any idea ought to be affirmed of the whole general idea to which theſe ſubdiviſions belong. What may be affirmed of all the individuals of any ſpecies, may be affirmed of the whole ſpecies; and what may be affirmed of all the ſpecies of any genus, may alſo be affirmed of the whole genus. This way of reaſoning, where we infer univerſally concerning any idea, what we had before affirmed or denied ſeparately of all its ſeveral ſubdiviſions and parts, is called reaſoning by induction. thus, if we ſuppoſe the whole tribe of animals ſubdivided into men, beaſts, birds, inſects and fiſhes, and then reaſon concerning them in this manner; all men have a power of beginning motion, all beaſts, birds, and inſects have a power of beginning motion, all fiſhes have a power of beginning motion; therefore all animals have a power of beginning motion.

For the method of reaſoning by a concatenation of ſyllogiſms, ſee the article DEMONSTRATION.

For the method of reaſoning by dilemma, ſee the article DILEMMA.

RE-ATTACHMENT, in law, is a ſecond attachment of a perſon, who was formerly attached and diſmiſſed the court without day, on account of the not coming of the juſtices, or other ſuch caſualty: without which, a cauſe diſcontinued cannot be revived, but the defendant muſt plead de novo.

RE-BAPTISANTS, the ſame with anabaptiſts. See ANABAPTITS.

REBATE, or REBATEMENT, in commerce, a term much uſed at Amſterdam, for an abatement in the price of ſeveral commodities, when the buyer, inſtead of taking time, advances ready money.

Rebate, which among us is uſually called prompt-payment, is eſtimated by months, and is only allowed for certain merchandize, which, according to the cuſtom of Amſterdam, are

German wools,	which are ſold at	15	months rebate.
Spaniſh wools,		21	
Aſhes and pot-aſhes,		18	
Italian ſilks,		33	
Sugars of Brazil,		18	

That is, thoſe commodities are ſold for ready money, only deducting or rebating the intereſt of the money, which need not have been paid till the end of 15, 21, &c. months. This intereſt is uſually regulated on the foot of 8 *per cent. per annum.*

REBATEMENT, in heraldry, a diminution or abatement of the bearings in a coat of arms. See ABATEMENT.

REBEL, a town of Germany, in the dutchy of Mecklenburgh, thirty-two miles ſouth-eaſt of Guſtrow.

REBELLION, a traiterous taking up of arms againſt the king by his own natural ſubjects, or thoſe formerly ſubdued.

Commiſſion of REBELLION. See the article COMMISSION.

REBELLIOUS ASSEMBLY, in law, an aſſembling together of twelve or more perſons, with an intent of unlawfully making uſe of their own authority, to change or alter any laws of this kingdom, or to deſtroy the incloſures of any ground, or the banks of any fiſh-pond, pool, or conduit, to the intent that it may lie waſte and void; or to deſtroy the deer in any park, fiſh in fiſh-ponds, coneys in any warren; or any houſe, barn, mills, or bays; or to burn ſacks of corn, abate rents, or prices of victuals, &c. See the article RIOT.

REBOUND. See RECOIL.

REBUS, an ænigmatical repreſentation of ſome name, &c. by uſing figures or pictures inſtead of words, or parts of words. Camden mentions an inſtance of this abſurd kind of wit in a gallant who expreſſed his love to a woman, named Roſe Hill, by painting in the border of his gown a *roſe*, a *hill*, an *eye*, a *loaf*, and a *well*; which, in the ſtyle of the rebus, reads, *Roſe Hill I love well.* This kind of wit was long practiſed by the great, who took the pains to find devices for their names. It was, however happily ridiculed by Ben Johnſon, in the humourous deſcription of Abel Drugger's device, in the Alchemiſt; and by the Spectator, in the device of Jack of Newbery; at which time the rebus, being raiſed to ſign poſts, was grown out of faſhion at court.

REBUTTER, in law, the defendant's anſwer to the plaintiff's ſurrejoinder, in a cauſe depending in the court of chancery, &c. Alſo when a perſon warrants lands, &c. to another, and he that has the warranty, or his heir, ſues him to whom the warranty is made, or his heir or aſſignee for the ſame

thing; if he, who is ſued, plead the deed or fine with warranty, and pray judgment whether the plaintiff ſhall be received to demand the thing which he ought to warrant to the party, againſt the warranty in the deed, &c. this is called a rebutter.

RECANATI, a town of Italy, in the province of Ancona, ſix miles weſt of Loretto.

RECAPITULATION, in oratory, &c. a part of the peroration. See the article PERORATION.

Recapitulation is a ſummary, or a conciſe and tranſient enumeration of the principal things inſiſted on in the preceding diſcourſe, whereby the force of the whole is collected into one view.

RECAPTION, in law, the taking a ſecond diſtreſs of one formerly diſtrained for the ſame cauſe during the plea grounded upon the former diſtreſs. It is alſo the name of a writ which lies for the party thus diſtrained, to recover damages, &c.

RECEIPT, or RECEIT, in commerce, an acquittance, or diſcharge, in writing, intimating that the party has received a certain ſum of money, either in full for the whole debt, or in part, or on account.

RECEIPT, in book-keeping, is an account of all the money and goods received. See the article BOOK.

RECEIPT, or RESCEIT, in law. See the article RESCEIT.

RECEIPT *of the exchequer*. See the article EXCHEQUER.

RECEIPT, in medicine. See RECIPE.

Auditor of the RECEIPTS. See the article AUDITOR.

RECEIVER, in chemiſtry, a veſſel of earth, glaſs, &c. for receiving any diſtilled liquor.

RECEIVER, in pneumatics, a glaſs-veſſel for containing the thing on which an experiment in the air-pump is to be made. See AIR-PUMP, EXHAUSTED, &c.

There are ſeveral ſorts of glaſs-receivers; As A (plate CCXXVIII. fig. 3. n° 1.) open at top, covered with a braſs-plate, and oiled leather, at D, and kept down by the croſs-piece EF, ſcrewed down upon the pillars B, C, which are ſcrewed into the table of the air-pump. See the articles AIR and PUMP.

H (*ib.* n° 2.) is a receiver open at top, with a plate and collar of wet leathers K, through which goes the ſlip-wire GI, ſo tight as to let in no air: this wire ſerves to lift any thing by its hook.

M (*ib.* n° 3.) is a transferrer, or receiver, that may be taken off from the pump, in an exhauſted ſtate; N being a plate and leather, on which ſtands the receiver M, cloſe at top; and O, a cock, to open or ſhut the paſſage. Now, the cock being open, and the air exhauſted by the pump, if the cock be ſhut, the receiver and pipe may be taken away from the air-pump, the vacuum remaining in M.

Mr. Boyle obſerves, that a very ſmall crack in the receiver, uſed in pneumatical experiments, does not render them uſeleſs; for upon evacuating the internal air, the external preſſing the glaſs on all ſides, brings the edges of the glaſs cloſe together. But in caſe of conſiderable flaws, a plaſter may be applied, made of quick-lime, finely powdered, and nimbly ground, with a proper quantity of the ſcrapings of cheeſe, and water enough to bring the mixture to a ſoft paſte; which, when the ingredients are well incorporated, will have a ſtrong and fetid ſcent; and then it muſt be immediately ſpread upon a linnen-cloth, and applied, leſt it begin to harden.

RECEIVER, *receptor* or *receptator*, in law, is commonly underſtood in a bad ſenſe, and uſed for ſuch as knowingly receive ſtolen goods from thieves, and conceal them. This crime is felony, and the puniſhment is tranſportation for fourteen years.

RECEIVER alſo ſignifies an officer; of which there are ſeveral kinds, denominated from the particular matters they receive, the places where, or the perſons from whom, &c. 1. Receiver of the fines is an officer appointed to receive the money of ſuch perſons as compound with the king, upon original writs ſued out of chancery. 2. Receiver general of the dutchy of Lancaſter is an officer belonging to the dutchy-court, who collects all the revenues, fines, forfeitures, and aſſeſſments within that dutchy. 3. Receiver general of the public revenue, is an officer appointed in every county, to receive the taxes granted by parliament, and remit the money to the treaſury.

RECEPTACULUM CHYLI, or PECQUET'S RESERVATORY, the reſervoir or receptacle for the chyle, ſituated in the left ſide of the upper vertebra of the loins, under the aorta, and the veſſels of the

Fig. 1. The RATTLE-SNAKE

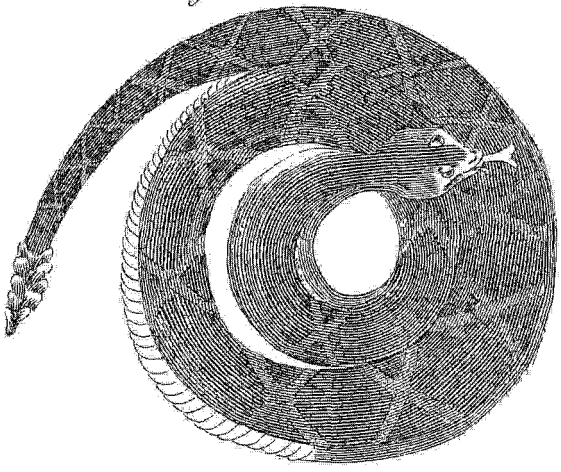


Fig. 2 RAVONANT

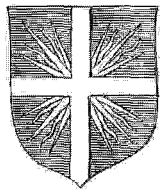


Fig. 3. RECEIVERS

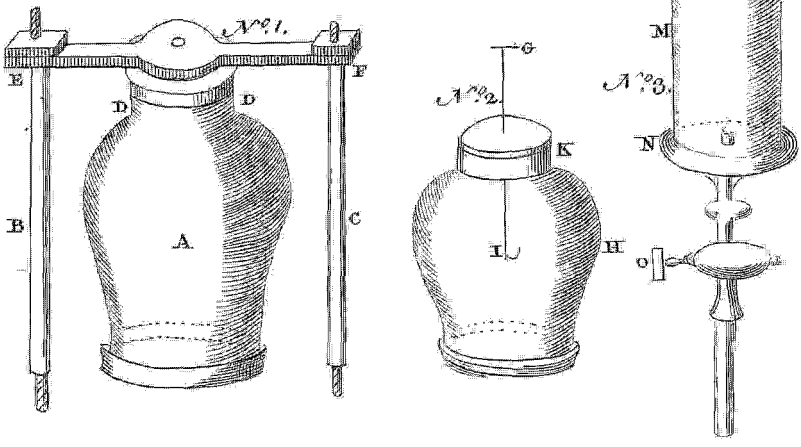
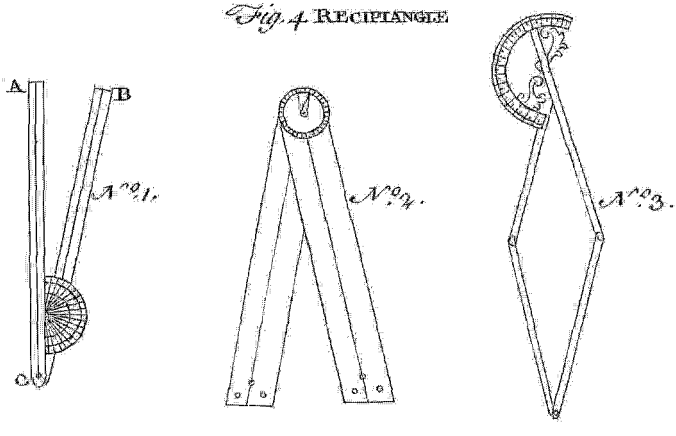


Fig. 4 RECIPIANGLE



the left kidney. See CHYLIFICATION and THORACIC DUCT.

RECEPTACULUM SEMINUM, RECEPTACLE OF THE SEED, a term uſed by botaniſts, for the baſe, or thalamus, which ſupports the ſeeds: the diſc of this part is either flat, concave, convex, globular, or pyramidal; and its ſurface is ſometimes naked, and ſometimes paleaceous.

RECESSUS IMPERII, or RECESS *of the empire*, ſignifies a collection of the determinations of a diet of the german empire. See DIET and EMPIRE.

RECHABITES, a kind of religious order among the antient Jews, inſtituted by Jonadab, the ſon of Rechab, comprehending only his own family and poſterity.

Their founder preſcribed them three things: firſt, not to drink any wine; ſecondly, not to build any houſes, but to dwell in tents; and thirdly, not to ſow any corn, or plant vines. Theſe rules the rechabites obſerved with great ſtrictneſs.

RECHACING, in hunting, driving back the deer, or other beaſts, into the foreſts, chaces, *&c.* from whence they had ſtrayed.

RECHANGE, or RE-EXCHANGE. See the article RE-EXCHANGE.

At ſea they uſe the term rechange for a tackle kept in reſerve, in caſe that already in uſe ſhould fail. See TACKLE.

RECHARGE, a ſecond charge or loading of a fire-arm.

The recharge ſhould never be ſo deep as the firſt charge, leſt the piece, being overheated, ſhould burſt.

RECHEAT, in hunting, a leſſon which the huntſmen play on the horn, when the hounds have loſt their game, to call them back from purſuing a counter-ſcent.

RECIPE, in medicine, a preſcription or remedy, to be taken by a patient; ſo called becauſe always beginning with the word *recipe*, *i. e. take*; which is generally denoted by the abbreviature ℞.

For the rules proper to be obſerved in forming recipes, ſee PRESCRIPTION.

RECIPIANGLE, or RECIPIENT-ANGLE, a mathematical inſtrument, ſerving to meaſure re-entering and ſaliant angles, eſpecially in fortification.

It uſually conſiſts of two arms, or rulers, A C, and B C (plate CCXXVIII. fig. 4. n° 1.) riveted together at C, and capable of being opened and cloſed, like a ſector. To take an angle with it, they lay the center of a protractor over the joint C, and apply its diameter to one of the rulers; then the degrees cut by the edge of the other ruler, ſhew the quantity of the angle.

There are other forms of this inſtrument; that repreſented *ibid.* n° 2. has a graduated circle, by which the angles may be readily meaſured by its index: and n° 3. *ibid.* is another kind compoſed of four equal rulers of braſs, riveted together by their ends, ſo as to form a parallelogram; and on one of the rulers is fixed a graduated ſemi-circle, which meaſures the oppoſite angle of the parallelogram, by means of one of the rulers produced, ſo as to ſerve inſtead of an index.

RECIPIENT, the ſame with receiver. See the article RECEIVER.

RECIPROCAL, in general, ſomething that is mutual, or which is returned equally on both ſides, or that affects both parties alike.

There are reciprocal duties between the prince and his ſubjects, between the huſband and wife, *&c.* alſo in a phyſical ſenſe, the action between the agent and patient is reciprocal: that is, the patient re-acts as much upon the agent, as this acts upon it. See REACTION.

RECIPROCAL TERMS, among logicians, are thoſe which have the ſame ſignification; and conſequently are convertible, or may be uſed for each other.

RECIPROCAL VERSES, in grammar, are thoſe which expreſs an action that is reflected upon the agent or agents, as,

Ces quatre hommes s'entrebattoient.

Theſe four men fought together.

Reciprocal verſes, in poetry, are ſuch as run the ſame both forwards and backwards.

RECIPROCAL FIGURES, in geometry, thoſe which have the antecedents and conſequents of the ſame ratio, in both figures. Thus, in plate CCXXIX. fig. 4. the ſide A:B::C:D; or 12:4::9:3; that is, as much as the ſide A, in the firſt rectangle, is longer than B, ſo much deeper is the ſide C, in the ſecond rectangle, than the ſide D in the firſt; and, conſequently, the greater length of the one is compenſated by the greater breadth or depth of the other; for as the ſide A is $\frac{1}{3}$ longer than C, ſo B is $\frac{1}{3}$ longer than D, and the rectangles of courſe equal; that is, $A \times D = B \times C$, or $12 \times 3 = 4 \times 9 = 36$.

This is the foundation of that capital theorem, *viz.* that the rectangle of the extremes is always equal to that of the

means; and, conſequently, the reaſon of the rule of three. See RULE.

Hence it follows, that if any two triangles, parallelograms, priſms, parallelopipeds, pyramids, cones, or cylinders have their baſes and altitudes reciprocally proportional, thoſe two figures or ſolids are equal to each other; and *vice verſa*, if they are equal, then their baſes and altitudes are reciprocally proportional. See TRIANGLE, PARALLELOGRAM, *&c.*

RECIPROCAL PROPORTION, in arithmetic, is when, in four numbers, the fourth is leſs than the ſecond, by ſo much as the third is greater than the firſt; and *vice verſa*. See the article PROPORTION.

This is the foundation of the inverſe, or indirect rule of three: thus, 4:10:: 8:5. See the article RULE.

Reciprocal proportion is of great uſe in determining the laws of motion. See the article MOTION.

RECITATIVO, or RECITATIVE, in muſic, a kind of ſinging, that differs but little from ordinary pronunciation, ſuch as that in which the ſeveral parts of the liturgy are rehearſed in cathedrals; or that wherein the actors commonly deliver themſelves on the theatre at the opera, when they are to expreſs ſome action or paſſion, to relate ſome event, or reveal ſome deſign.

Notwithſtanding this ſort of compoſition is noted in true time, the performer is at liberty to alter the bars of meaſure, and make ſome long and others ſhort, as his ſubject requires: hence the thorough baſs to the recitative is uſually placed below the other, to the end that he, who is to accompany the voice, may rather obſerve and follow the ſinger, than the perſon that beats the time.

RECKONING, or *a ſhip's* RECKONING, in navigation, is that account, whereby at any time it may be known where the ſhip is, and on what courſe or courſes ſhe is to ſteer, in order to gain her port; and that account taken from the log-board is called the dead-reckoning. See LOG-BOARD, JOURNAL, *&c.*

But as the ſhip's motion is liable to be diſturbed from a variety of cauſes, ſuch as the lee-way, variation of the compaſs, currents, unſteadineſs of the wind, *&c.* her place, according to the dead-reckoning, may be juſtly doubted; and therefore mariners try every way to find the latitude their ſhip is in, by obſervations of the ſun or ſtars. See the articles LEE-WAY, VARIATION, CURRENT, WIND, and LATITUDE.

Now, if the latitude found by obſervation, and that found by the dead-reckoning, agree, it is preſumed the ſhip's place is well determined; but if they diſagree, the account of longitude muſt be corrected: and for the latitude, that found by obſervation is always to be depended on.

In correcting the longitude found by the dead-reckoning, conſider whether the difference may not have been occaſioned by a current; and, if poſſible, make an eſtimate of it, as directed under the article CURRENT.

The buſineſs of correcting the dead-reckoning is a very precarious operation, and at beſt is little more than gueſſing; ſince there may be unknown currents, occaſioned by trade-winds, the tides following the moon, ſtormy weather, *&c.* hence the beſt mariners are not able to pronounce with certainty, whether the ſhip may not be to the eaſtward or weſtward of the point wherein the dead-reckoning places her.

However, the following methods are thoſe uſually taken to diſcover her true place: 1. If the difference of latitude be much more than the departure, or the direct courſe has been within three points of the meridian, then the error is moſt likely in the diſtance run. 2. If the departure is much greater than the difference of latitude, or the direct courſe is within three points of the parallel, or more than five points from the meridian; the error may be aſcribed to the courſe. 3. But if the courſes are, in general, near the middle of the quadrant, the error may be either in the courſe, or in the diſtance, or in both. For to cauſe an alteration in the difference of latitude, the firſt of theſe caſes requires a greater error in the courſe, than can well be ſuppoſed to have been committed: in the ſecond caſe, the diſtances muſt be ſo faulty, as would ſcarce eſcape obſervation; and, in the third caſe, it is often doubtful, whether to attribute the error to the courſe or diſtance; and therefore it is uſually corrected in both.

As for the methods of correcting the dead-reckoning by the variation-chart, and by actually finding the ſhip's true longitude from celeſtial obſervations, ſee the articles VARIATION and LONGITUDE.

RECLAIMING, or RECLAMING, in our antient cuſtoms, a lord's purſuing, proſecuting,

ſecuting, and recalling his vaſſal, who had gone to live in another place without his permiſſion.

Reclaiming is alſo uſed for the demanding of a perſon, or thing, to be delivered up to the prince or ſtate to which it properly belongs; when, by any irregular means, it is come into another's poſſeſſion.

RECLAIMING, in falconry, is taming a hawk, *&c.* and making her gentle and familiar.

A partridge is ſaid to reclaim, when ſhe calls her young ones together, upon their ſcattering too much from her.

RECLINER, or RECLINING DIAL. See the article DIAL.

RECLUSE, among the papiſts, a perſon ſhut up in a ſmall cell of an hermitage, or monaſtery, and cut off, not only from all converſation with the world, but even with the houſe. This is a kind of voluntary impriſonment, from a motive either of devotion or penance.

The word is alſo applied to incontinent wives, whom their huſbands procure to be thus kept in perpetual impriſonment in ſome religious houſe.

Recluſes were antiently very numerous: they took an oath, never to ſtir out of their retreat; and having entered it, the biſhop ſet his ſeal upon the door; and the recluſe was to have every thing neceſſary for the ſupport of life, conveyed to him through a window. If he was a prieſt, he was allowed a ſmall oratory, with a window, which looked into the church, through which he might make his offerings at the maſs, hear the ſinging, and anſwer thoſe who ſpoke to him; but this window had curtains before it, ſo that he could not be ſeen. He was allowed a little garden, adjoining to his cell, in which he might plant a few herbs, and breathe a little freſh air. If he had diſciples, their cells were contiguous to his, with only a window of communication, through which they conveyed neceſſaries to him, and received his inſtructions. If a recluſe fell ſick, his door might be opened for perſons to come in and aſſiſt him, but he himſelf was not to ſtir out.

F. Helyot gives a particular account of the ceremonies practiſed in the recluſion of a woman, in that of mother de Cambray, in the year 1625. The biſhop waited for her, early in the morning at the church-door; and upon her arrival and proſtrating herſelf at the feet of that prelate, he gave her his benediction; conducted her to the grand altar, and there bleſſed a mantle, veil, and ſcapular, put them on her and gave her a new name. Having here made her vow, and the biſhop having harangued the people in praiſe of the new recluſe, he conducted her proceſſionally to her recluſion; the clergy all the way ſinging, *Veni, ſponſa Chriſti, &c.* Here the biſhop, bleſſing her afreſh, conſecrated the recluſion, and ſhut her up in perpetual confinement.

RECOGNITION, in law, an acknowledgement; a word particularly uſed in our law-books, for the firſt chapter of the ſtatute 1 Jac. I. by which the parliament acknowledged, that, after the death of queen Elizabeth, the crown had rightfully deſcended to king James.

RECOGNITIONE ADNULLANDA PER VIM, ET DURITIEM FACTA, in law, is a writ to the juſtices of the common pleas, for ſending a record of a recognizance, which the recognizor ſuggeſts to have been acknowledged by force and hard dealing; in order that if it ſo appear, it may be annulled.

RECOGNIZANCE, or RECOGNISANCE, in law, a bond or obligation of record, acknowledged to the king: thus called, becauſe recognized or acknowledged in ſome court of record, or before ſome judge, maſter in chancery, or juſtice of the peace.

There are recognizances as well for debt, as of bail, for good behaviour, and for appearance to proſecute felons, *&c.* which laſt kinds, acknowledged before juſtices of the peace, are by them to be returned to the ſeſſions, otherwiſe an information lies againſt them.

In recognizances for bail, *&c.* before a juſtice, the principal is bound in double the ſum of the ſureties, the uſual number of whom are two, and the penalty is 40l. at leaſt. Mere recognizances are not ſealed, but enrolled; and execution, by force thereof, is of all the recognizor's goods or chattels (except draught-horſes and implements of huſbandry) and the moiety of his land. The execution upon a recognizance, is termed an extent. See the article EXTENT.

The party bound in a recognizance, is called recognizor; and the perſon to whom he is bound, is termed the recognizee.

Recognizance is alſo uſed in our antient ſtatutes, for the verdict of the twelve jurors upon an aſſiſe; hence called recognitors.

RECOIL, or REBOUND, the ſtarting backward of a fire-arm, after an exploſion.

Merſennus

Merſennus tells us, that a cannon 12 feet in length, weighing 6400 lb. gives a ball of 24 lb. an uniform velocity of 640 feet per ſecond. Putting, therefore, $W = 6400$, $w = 24$, $V = 640$, and $v =$ the velocity with which the cannon recoils; we ſhall have (becauſe the momentums of the cannon and ball are equal) $Wv = wV$; and ſo $v = \frac{wV}{W} = \frac{24 \times 64}{6400} = 2\frac{4}{5}$; that is, it would recoil at the rate of $2\frac{4}{5}$ feet per ſecond, if free to move. See GUNNERY and PROJECTILE.

RECOLLECTION, a mode of thinking, by which ideas ſought after by the mind, are found, and brought again to view.

RECOLLECTS, a congregation of reformed franciſcans, called alſo friers-minors of St. Francis, of the ſtrict obſervance. See FRANCISCANS.

RECONCILIARI, in our law-books, *&c.* A church is ſaid reconciliari, to be reconciled, when it is conſecrated afreſh, after having been polluted or prophaned, as by being in the poſſeſſion of pagans, heretics, *&c.*

RECONNOITRE, in war, to view and examine the ſtate and ſituation of things.

RECORD, an authentic teſtimony in writing, contained in rolls of parchment, and preſerved in a court of record.

Records are ſaid to be of three kinds, *viz.* a record judicial, an attainder, *&c.* a record miniſterial, upon oath, as an office or inquiſition found; and a record made by conveyance and conſent, as a fine, *&c.*

RECORD, among fowlers, is a bird's beginning to tune or ſing, as it were within itſelf; or to perform its notes and diſpoſe its organs for ſinging. The cock-thruſh is diſtinguiſhed from the hen in recording, the firſt being more loud and frequent in it than the ſecond.

RECORDARE FACIAS, a writ directed to the ſheriff, to remove a cauſe out of an inferior court, into the king's bench or common pleas.

RECORDER, a perſon whom the mayor and other magiſtrates of a city or corporation aſſociate to them, for their better direction in matters of juſtice, and proceedings in law; on which account this perſon is generally a counſellor, or other perſon well ſkilled in the law.

The recorder of London is choſen by the lord-mayor and aldermen; and, as he is held to be the mouth of the city, he delivers the judgment of the courts therein, and records and certifies the city cuſtoms.

RECORDO ET PROCESSO MITTENDIS, is a writ to call a record, together with the whole proceedings in a cauſe, out of an inferior court into the king's court.

RECOVERY, in law, is obtaining any thing by judgment or trial at law.

Recoveries are of two kinds, a true recovery, and a feigned or common one. A true recovery is the actual recovering of any thing, or its value, by judgment and trial at law: as where a perſon is ſued for land, or other things real and perſonal, and obtains a verdict in his favour. A feigned or common recovery, is a formal act by conſent, made uſe of for the better ſecuring of lands, tenements, *&c.* the end and effect of which is, to dock and deſtroy eſtates-tail, remainders, and reverſions, and to bar the former owners. In a common recovery, there muſt be at leaſt three parties, *viz.* the demandant, tenant, and vouchee: the demandant is the perſon that brings the writ of entry, and therefore may be termed the recoveror; the tenant is he againſt whom the writ is brought, who may be termed the recoveree; and the vouchee is the perſon whom the tenant vouches, or calls to warrant for the lands demanded: thus, when a perſon is deſirous to cut off an eſtate-tail in lands, *&c.* he cauſes a feigned writ of entry ſur diſſeiſin en le port to be brought by ſome friend, who is the demandant, for thoſe lands, *&c.* who in a feigned declaration thereupon made, pretends that he was diſſeiſed by him, who, by a feigned fine, or deed of bargain and ſale, is named and ſuppoſed to be the tenant of the land: this feigned tenant, if it be a ſingle recovery, is made to appear and vouch to warranty the crier of the court of common pleas, or the bag-bearer of writs to the cuſtos brevium in that court, who is termed the common vouchee, and is ſuppoſed to warrant the title; but he making default, a judgment is by this fiction entered, that the demandant ſhall recover, and have a writ of ſeiſin for the poſſeſſion of the lands in queſtion; and that the tenants ſhall recover the value of the lands againſt the common vouchee: though this recovery in value is only imaginary, yet it is looked upon as a bar to the intail for ever.

RECREMENT, in chemiſtry, ſome ſuperfluous matter ſeparated from ſome other that

Fig. 2. RECURVIROSTRA.

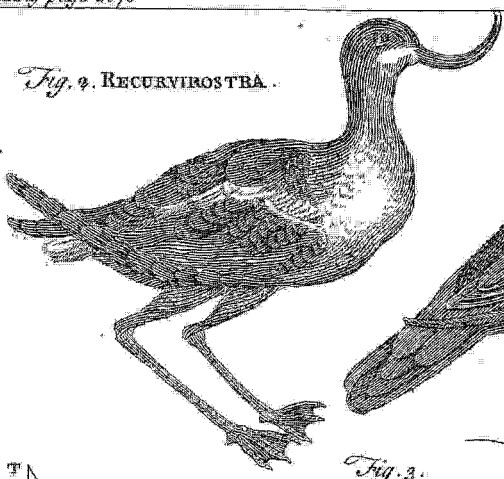
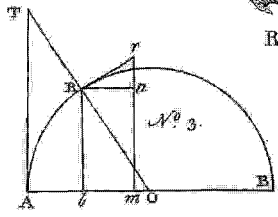
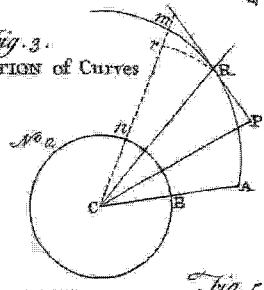


Fig. 1. The REDSTART.

Fig. 3.
RECTIFICATION of Curves





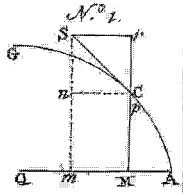


Fig. 4. RECIPROCAL *FIGURES*.

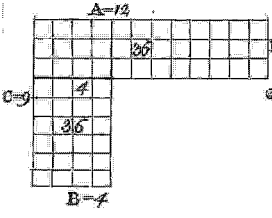


Fig. 5. REEL.

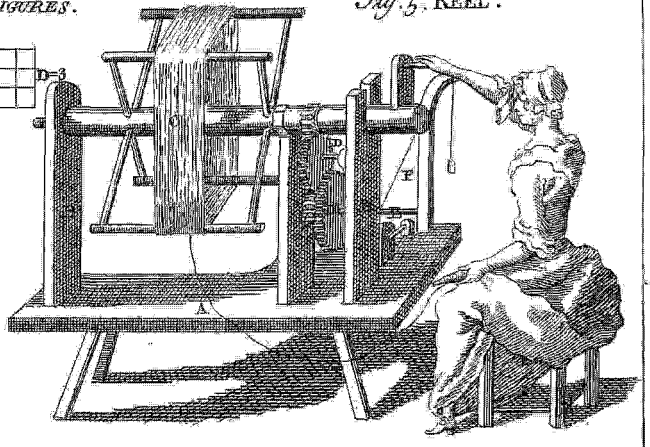
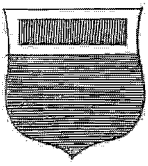


Fig. 6. REMPLY.



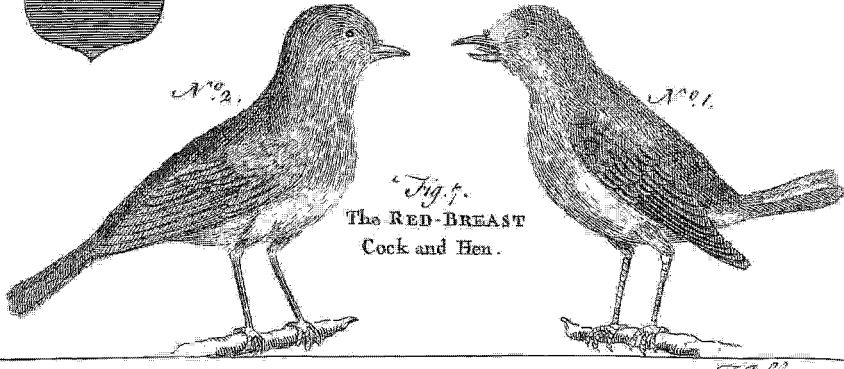


Fig. 7.
The RED-BREAST
Cock and Hen.

T. Jefferys sculp.

that is useful; in which sense it is the same with scoriæ, fæces, and excrements. See the article SCORIÆ, &c.

RECRIMINATION, in law, an accusation brought by the accused against the accuser, upon the same fact. See the article ACCUSATION.

RECRUITS, in military affairs, new-raised soldiers, designed to supply the place of those who have lost their lives in the service, or are disabled by age or wounds. See the article SOLDIERS.

RECTANGLE, in geometry, the same with a right-angled parallelogram. See the article PARALLELOGRAM.

In arithmetic and algebra, a rectangle signifies the same with factum or product. See the articles PRODUCT and MULTIPLICATION.

RECTANGLED, RECTANGULAR, or RIGHT-ANGLED, appellations given to figures and solids which have one or more right angles: thus a triangle with one right angle, is termed a rectangled triangle; also parallelograms with right angles, squares, cubes, &c. are rectangular.

Solids, as cones, cylinders, &c. are also said to be rectangular, with respect to their situation, when their axes are perpendicular to the plane of the horizon.

The antient geometricians always called the parabola, the rectangular section of a cone. See CONIC SECTIONS and PARABOLA.

RECTIFICATION, the art of setting any thing to rights: and hence, to rectify the globes, is to fit them for performing any problem. See GLOBE.

RECTIFICATION, in geometry, is the finding a right line, equal in length to a curve. See the article CURVE.

The rectification of curves is a branch of the higher geometry, where the use of the inverse method of fluxions, is very conspicuous.

Case I. Let ACG (pl. CCXXIX. fig. 3. n° 1.) be any kind of curve, whose ordinates are parallel to themselves, and perpendicular to the axis AQ. Then if the fluxion of the abscis AM be denoted by Mm, or by Cn, (equal and parallel to Mm) and nS, equal and parallel to Cr, be the representation of the corresponding fluxion of the ordinate MC; then will the diagonal CS, touching the curve in C, be the line which the generating point p, would describe, were its motion to become uniform at C; which line, therefore, truly expresses the fluxion of the space AC, gone over. See the article FLUXION.

Hence, putting AM $= x$, CM $= y$, and AC $= z$; we have $\dot{z}$ $(= \text{CS} = \sqrt{\text{C}n^2 + \text{S}n^2} = \sqrt{\dot{x}^2 + \dot{y}^2}$; from which, and the equation of the curve, the value of $\dot{z}$ may be determined. Thus, let the curve proposed be a parabola of any kind, the general equation for which is $x = \frac{y^n}{a^{n-1}}$; and hence $\dot{x} = \frac{n y^{n-1} \dot{y}}{a^{n-1}}$, and therefore $\dot{z}$ $(= \sqrt{\dot{y}^2 + \dot{x}^2}) = \sqrt{\dot{y}^2 + \frac{n^2 y^{2n-2} \dot{y}^2}{a^{2n-2}}} = \dot{y} \times 1 + \frac{n^2 y^{2n-2}}{a^{2n-2}}\Big]^{\frac{1}{2}}$; the fluent of which, universally expressed in an infinite series, is $y + \frac{n^2 y^{2n-1}}{2n-1 \times 2a^{2n-2}} - \frac{n^4 y^{4n-3}}{4n-3 \times 8a^{4n-4}} + \frac{n^6 y^{6n-5}}{6n-5 \times 16a^{6n-6}}$ &c. $= z$.

Case II. Let all the ordinates of the proposed curve ARM (*ibid.* n° 2.) be referred to a center C: then, putting the tangent RP (intercepted by the perpendicular CP) $= t$, the arch, BN, of a circle, described about the center C, $= x$; and the radius CN (or CB) $= a$; we have $\dot{z} : \dot{y} :: y$ (CR : t (RP); and, consequently, $\dot{z} = \frac{\dot{y} y}{t}$: from whence the value of $\dot{z}$ may be found, if the relation of y and t is given. But, in other cases, it will be better to work from the following equation, *viz.* $\dot{z} = \sqrt{\dot{y}^2 + \frac{y^2 \dot{x}^2}{a^2}}$, which is thus derived; let the right line CR, be conceived to revolve about the center C; then since the celerity of the generating point R, in a direction perpendicular to CR, is to $(\dot{x})$ the celerity of the point N, as CR (y) to CN (a), it will therefore be truly represented by $\frac{y \dot{x}}{a}$; which being to $(\dot{y})$ the celerity in the direction of CR, produced as CB (s) : RP (t), it follows that $\frac{y^2 \dot{x}^2}{a^2} : \dot{y}^2 :: s^2 : t^2$; whence, by composition, $\frac{y^2 \dot{x}^2}{a^2} + \dot{y}^2 : \dot{y}^2 :: s^2 + t^2$ $(y^2) : t^2$; there-

fore

fore $\frac{y^2\dot{x}^2}{a^2}+\dot{y}^2=\frac{y^2\dot{y}^2}{t^2}$, and consequently $\sqrt{\frac{y^2\dot{x}^2}{a^2}+\dot{y}^2}\left(=\frac{y\dot{y}}{t}\right)=\dot{z}$. Q. E. D.

But the same conclusion may be more easily deduced from the increments of the flowing quantities: for, if Rm, rm, and Nn be assumed to represent $(\dot{z},\dot{y},\dot{x})$ any very small corresponding increments of AR, CR, and BN; then will CN (a) : CR (y) :: $\dot{x}$ (the arch Nn) : the similar arch R$r=\frac{y\dot{x}}{a}$. And if the triangle Rrm (which, while the point m is returning back to R, approaches continually nearer and nearer to a similitude with CRP) be considered as rectilinear, we shall also obtain $\dot{z}^2\left(=\mathrm{R}m^2=\mathrm{R}r^2+rm^2\right)=\frac{y^2\dot{x}^2}{a^2}+\dot{y}^2$; and $\sqrt{\frac{y^2\dot{x}^2}{a^2}+\dot{y}^2}\left(=\frac{y\dot{y}}{a}\right)=\dot{z}$, as before.

Now from the right sine, versed sine, tangent, or secant of an arch of a circle OARB (*ibid.* n° 3.) given: to find the length of the arch itself, in terms thereof. Put the versed sine AB $=x$, the right sine R$b=y$, the tangent AT $=t$, the secant OT $=s$, the arch AR $=z$, and the radius AO, or RO $=a$; also let R$n=\dot{x}$, $nr=\dot{y}$, and R$r=\dot{z}$: then, since $\angle rn\mathrm{R}$ (= a right angle) $=\angle Ob\mathrm{R}$, and $r\mathrm{R}n=\mathrm{OR}b$, the triangles rRn, and ORb, are equiangular; and Rb (y) : OR (a) :: Rn $(\dot{x})$: Rr $(\dot{z})=\frac{a\dot{x}}{\sqrt{2ax-xx}}$; because, by the property of the circle, $y=\sqrt{2ax-xx}$. Also, Ob $\left(\sqrt{a^2-y^2}\right)$: OR (a) :: nr $(\dot{y})$: Rr $(\dot{z})=\frac{a\dot{y}}{\sqrt{a^2-y^2}}$.

These two values exhibit the fluxion of the arch, in terms of the versed sine and right sine, respectively: and to get the same in terms of the tangent and secant, we have OT $\left(=s=\sqrt{a^2+t^2}\right)$: OA (a) :: OR (a) : O$b=\frac{a^2}{s}=\frac{a^2}{\sqrt{a^2+t^2}}$. Hence A$b=a-\frac{a^2}{s}=a-\frac{a^2}{\sqrt{a^2+t^2}}$, whose fluxion $=\frac{a^2\dot{s}}{s^2}=\frac{a^2+t\dot{t}}{\left(a^2+t^2\right)^{\frac{3}{2}}}$; whence AT $\left(=\sqrt{s^2-a^2}=t\right)$: OT $\left(=s=\sqrt{a^2+t^2}\right)$ :: Rn : R$r=\frac{a^2\dot{s}}{s\sqrt{s^2-a^2}}=\frac{a^2\dot{t}}{a^2+t^2}=\dot{z}$.

Now from any one of these forms of fluxions, *viz.* $\frac{a\dot{x}}{\sqrt{2ax-xx}}$, $\frac{a\dot{y}}{\sqrt{a^2-y^2}}$, $\frac{a^2\dot{t}}{a^2+t^2}$, and $\frac{a^2\dot{s}}{s\sqrt{s^2-a^2}}$, the value of the arch itself (by taking the fluent in an infinite series) may be found. But the third form, expressed in terms of the tangent, being entirely free from radical quantities, will be the most ready in practice, especially where the required arch is but small, though the series, arising from the first form, always converges fastest.

If, therefore, $\frac{a^2\dot{t}}{a^2+t^2}$ be converted into an infinite series, we shall have $\dot{z}=\dot{t}-\frac{t^2\dot{t}}{a^2}+\frac{t^4\dot{t}}{a^4}-\frac{t^6\dot{t}}{a^6}+$, &c. and consequently, $z=t-\frac{t^3}{3a^2}+\frac{t^5}{5a^4}-\frac{t^7}{7a^6}+\frac{t^9}{9a^8}$ —&c. $=$ AR. Now if, for example, we suppose AR $=30°$, and AO (to render the operation more easy) $=$ unity, we shall have $t=\sqrt{\frac{1}{3}}=.5773502$; because O$b$ $\left(\sqrt{\frac{3}{4}}\right)$: bR $\left(\frac{1}{2}\right)$ :: OA (1) : AT $(t)=\frac{1}{\sqrt{3}}$. Whence $t^3=.1924500$, $t^5=.0641500$, $t^7=.0213833$, $t^9=0071277$, &c. And therefore AR $=.5773502-\frac{.1924500}{3}+\frac{.0641500}{5}-\frac{.0213833}{7}+\frac{.0071277}{9}$—&c. $=.5235987$; which, multiplied by 6, gives 3.141592, &c. for the length of the semi-periphery of a circle whose radius is 1.

RECTIFICATION, in chemistry, is nothing but the repetition of a distillation, or sublimation several times, in order to render the substance purer, finer, and freer from aqueous or earthy parts.

The perfection of rectifying spirits, according to Dr. Shaw, depends upon finding out a simple method of separating all the oil and water from it; and, he observes, that the great affinity betwixt the essential oil and spirit, is the physical cause of the difficulty found in the rectification of brandies. He recommends the way of working from a spirit largely diluted with water, into water again; whereby the essential oil would, at one operation, be doubly separated. See the article DISTILLATION, ALCOHOL, SPIRIT, &c.

RECTIFIER, in navigation, an inſtrument conſiſting of two parts, which are two circles either laid one upon, or let into, the other, and ſo faſtened together in their centers, that they repreſent two compaſſes, one fixed, the other moveable; each of them divided into the thirty-two points of the compaſs, and three hundred and ſixty degrees, and numbered both ways, from the north and the ſouth, ending at the eaſt and weſt, in ninety degrees.

The fixed compaſs repreſents the horizon, in which the north and all the other points of the compaſs are fixed and immoveable. See HORIZON.

The moveable compaſs repreſents the mariners compaſs, in which the north and all other points are liable to variation. See COMPASS.

In the center of the moveable compaſs is faſtened a ſilk thread, long enough to reach the outſide of the fixed compaſs. But, if the inſtrument be made of wood, there is an index inſtead of the thread.

Its uſe is to find the variation of the compaſs, to rectify the courſe at ſea; having the amplitude or azimuth given.

RECTIFYING *the globe*. See GLOBE.

RECTILINEAR, in geometry, right-lined; thus figures whoſe perimeter conſiſts of right lines, are ſaid to be rectilinear.

RECTITUDE, *rectitudo*, in philoſophy, refers either to the act of judging or of willing; and therefore whatever comes under the denomination of rectitude is either what is true or what is good; theſe being the only objects about which the mind exerciſes its two faculties of judging and willing.

Moral rectitude, or uprightneſs, is the chuſing and purſuing thoſe things which the mind, upon due enquiry and attention, clearly perceives to be good; and avoiding thoſe that are evil.

RECTO, in law, uſually termed a writ of right, is of ſo high a nature, that while other writs in real actions are only for the recovery of the poſſeſſion of the lands, *&c.* in queſtion, this writ tends to recover both the ſeiſin and the property; by which means both the rights of poſſeſſion and property are tried together. There are two kinds of this writ, *viz.* a writ of right patent, ſo called becauſe it is ſent open; it lies for him that has the fee-ſimple in the lands, *&c.* ſued for, againſt a tenant of the freehold at leaſt: the other is a writ of right-cloſe, and lies where a perſon holds lands or tenements by charter in antient demeſne, in fee-ſimple, fee-tail, for term of life, or in dower, and is diſſeiſed. This writ is directed to the king's manors, or to the lord of an antient demeſne, commanding him to do right in his court.

Recto, or right, is alſo prefixed to the title of ſeveral other writs: as 1. *Recto de advocatione eccleſiæ*, which is a writ of right that lies where a perſon has right of advowſon in fee to him and his heirs; and the incumbent dying, a ſtranger preſents his clerk to the church; and he, not having brought this action of *quare impedit*, *&c.* within ſix months, has ſuffered the ſtranger to uſurp upon him. 2. *Recto de dote*, a writ of right of dower, which lies for a woman who has received part of her dower, and demands the remainder againſt the heir of her deceaſed huſband, or his guardian. 3. *Recto de dote unde nihil habet*, a writ of right that lies where a huſband having lands or tenements, has aſſigned a dower thereof to his wife, on which account ſhe is driven to ſue the heir, or his guardian, for her thirds. 4. *Recto quando dominus remiſit*, is a writ of right which lies where lands, *&c.* in the ſignory of any lord, are demanded by a writ of right. Thus if the lord hold no court, or, at the prayer of the demandant or tenant, ſend his writ to the king's court, to carry the cauſe thither, this writ iſſues for the other party. 5. *Recto de rationabili parte*, a writ of right patent, that lies between privies in blood; as brothers in gavel-kind, ſiſters, or other coparteners for land in fee-ſimple, demanding a certain portion of it to hold in ſeveralty. 6. *Recto ſur diſclaimer*, a writ which lies where a lord, in the court of common-pleas, avows upon his tenant, and the tenant diſclaims to hold of him; upon which the lord may bring this writ.

RECTOR, a term applied to ſeveral perſons whoſe offices are very different: as, 1. The rector of a pariſh is a clergyman that has the charge and cure of a pariſh, and poſſeſſes all the tythes, *&c.* 2. The ſame name is alſo given to the chief elective officer in ſeveral foreign univerſities, particularly in that of Paris. 3. Rector is alſo uſed in ſeveral convents for the ſuperior officer who governs the houſe: and the jeſuits give this

name to the ſuperiors of ſuch of their houſes as are either ſeminaries or colleges.

RECTORY, a pariſh-church, parſonage, or ſpiritual living, with all its rights, tythes and glebes.

Rectory is alſo ſometimes uſed for the rector's manſion or parſonage-houſe.

RECTUM, in anatomy, the third and laſt of the large inteſtines, or guts. See INTESTINES.

The rectum is in length about three hands breadth, and its diameter about three fingers. It has its beginning at the loweſt vertebræ of the loins, and at the lower end is the anus. See ANUS.

It is connected to the os ſacrum, the os coccygis, and the urinary bladder in men; but in women to the vagina uteri. The coats of the rectum are more thick and fleſhy than thoſe of any other of the inteſtines: it has in general no valves, but it has ſeveral rugæ: the abſence of valves here, is to prevent the expulſion of the fœces from being retarded.

RECTUS, in anatomy, a name common to ſeveral pair of muſcles, ſo called on account of the ſtraightneſs of their fibres, as, 1. The rectus major anticus, which ariſes from the tranſverſe apophyſes of the five lower vertebræ of the neck, and is inſerted in the os occipitis. 2. The rector minor anticus, called, by Cowper, muſculus annuens: this ariſes from the anterior ſurface of the atlas, or firſt vertebra of the neck; and lies concealed, as it were, under the former, till it is at length inſerted a little behind it, into the os occipitis: theſe two pair of muſcles ſerve to move the head forward. 3. The rectus major poſticus, one of the extenſors of the head, which has its origin from the ſpinoſe apophyſis of the epiſtrophæus, and is inſerted into the os occipitis. 4. The rectus minor poſticus, which is alſo one of the five extenſors of the head, has its riſe from the poſterior part of the atlas, and its end under the former. 5. The rectus lateralis, which ſerves to bend the head on one ſide, has its origin from the upper ſurface of the tranſverſe apophyſis of the atlas: from this it aſcends ſtrait with a ſhort body, but conſiderably thick; and is inſerted partly into the os occipitis, and partly into the temporal bone, near the inciſure of the maſtoide proceſs. 6. The rectus tibiæ, one of the four extenſors of the leg, which has its origin from the anterior and inferior ſpine of the ileum.

RECTUS IN CURIA, in law, one who ſtands at the bar, and no man objects any thing againſt him. So alſo when a perſon who has been outlawed has reverſed the outlawry, and can partake of the benefit of the law, he is ſaid to be rectus in curia.

RECURRENTS, in anatomy, a name given to ſeveral large branches of nerves ſent out by the par vagum from the upper part of the thorax to the larynx. See the article NERVE.

RECURRENT VERSES, are the ſame with thoſe called reciprocal. See the article RECIPROCAL.

RECURVIROSTRA, in ornithology, a genus of the ſcolopaces order of birds, the beak of which is of a depreſſed or flatted figure, and is pointed at the extremity and bent upwards: it is about the ſize of our common lapwing, or a little larger; its colour is variegated, black and white; the figure of its beak is extremely ſingular, being long, black throughout, flatted, and appears to be of a coreaceous ſubſtance rather than of a horny one, like that of the beaks of other birds; and its bending upwards in a part of a circle is alſo ſingular. See plate CCXXIX. fig. 2.

There is another ſpecies common in England, with a yellow breaſt, about the ſize of the common pigeon.

RECUSANTS, ſuch perſons as acknowledge the pope to be the ſupreme head of the church, and refuſe to acknowledge the king's ſupremacy; who are hence called popiſh recuſants. Theſe are in England charged with double taxes, not merely as romaniſts but as recuſants.

RECUSATION, the deſiring a judge to refrain from judging in a certain cauſe, on account of his kinſhip, capital enmity, &c. to one of the parties.

By the french laws, kinſhip within the fourth degree, whether of conſanguinity or alliance, is deemed a legal cauſe of recuſation; as alſo the judge's being godfather, &c. of one of the parties.

RED, in phyſics, one of the ſimple or primary colours of natural bodies, or rather of the rays of light. See COLOUR, LIGHT, and RAY.

The red rays are thoſe which of all others are the leaſt refrangible: hence, as Sir Iſaac Newton ſuppoſes the different degrees of refrangibility ariſe from the different magnitudes of the luminous particles whereof the rays conſiſt, the red rays, or red light, is concluded to be that which

which conſiſts of the largeſt particles. Authors diſtinguiſh three general kinds of red; one bordering on the blue, as columbine, or dove-colour, purple, and crimſon. Another bordering on yellow, as flame-colour and orange; and between theſe extremes is a medium, partaking neither of the one nor the other, which is what we properly call red. Mr. Boyle obſerves that red is an obvious, and generally a pleaſing colour; and that antiently it was cuſtomary to preſent red objects to elephants, to render them more fierce; and that the ſame colour irritates turkey-cocks. He obſerves alſo, that among the ſeveral changes of colour which bodies acquire, or diſcloſe, by digeſtion, it is very remarkable to find a redneſs rather than any other colour in moſt tinctures; and even in the more groſs ſolutions made of almoſt all concretes that abound either with mineral or vegetable ſulphur, though the menſtruum employed about theſe ſolutions or tinctures be never ſo limpid.

RED, in dying, is one of the five ſimple or mother colours; ſome reckon ſix kinds or caſts of red, *viz.* ſcarlet-red, crimſon-red, madder-red, half-grain-red, lively-orange-red, and ſcarlet of cochineal: but they may be all reduced to the three following, according to the three principal drugs which give the colours: *viz.* the kermes, cochineal and madder. See the article KERMES, COCHINEAL, and MADDER.

For the ſcarlet and crimſon reds, ſee the articles SCARLET and CRIMSON.

Madder-red is made with madder, to which ſome add realgal and arſenic; others common ſalt, or other ſalts, with wheat-flour; or agaric, with ſpirit of wine, galls, or turmeric. The half-grain is made with agaric and bran-water; half-ſcarlet-grain, half madder, and ſometimes turmeric. As to the lively orange-red, the ſtuff muſt be firſt put in yellow, then in a liquor made of goats-hair, which has been boiled ſeveral times with madder, and now diſſolved over the fire with certain acids, as urine, tartar, *&c.*

Beſides theſe reds, which are good and allowed colours, there is alſo a brazil-red, which is diſcouraged as fading eaſily. Of the ſix good reds only four have particular caſts or ſhades, the madder-red, the crimſon-red, the lively-orange-red, and the ſcarlet of cochineal: the caſts or ſhades of crimſon are freſh-colour, peach-colour, carnation-roſe-colour, and an apple-tree-flower colour; Thoſe of madder are freſh-colour, onion-peel-colour, and flame-colour; thoſe of the orange are the ſame with that of the crimſon; ſcarlet, beſides the ſhades of all the reſt, has ſome peculiar to itſelf, as cherry-colour, fire-colour, *&c.*

RED, in painting. For painting in oil-colours, they uſe a red called cinnabar, or vermilion, and another called Lacca. See the articles CINNABAR and LACCA. In limning and freſco, for a violet-red, inſtead of lacca they uſe reddle, a natural earth found in England: for a brown, they uſe ochre. See the articles REDDLE and OCHRE.

RED, in heraldry. See GULES.

RED, in coſmetics, a fucus, or paint, wherewith the ladies enliven their cheeks and lips. There are two kinds of theſe reds, one in leaves called ſpaniſh-red; the other a liquor which is an extract of a ſcarlet dye. See COSMETICS.

RED is an epithet uſed in the engliſh names of ſeveral birds, as the red-game, red-ſhank, red-ſtart, red-breaſt, red-wing, *&c.*

The red-game is a ſpecies of the tetrao, common in the mountains of Yorkſhire, and ſome other of the northern countries. It is of the ſhape of a partridge, but much larger, and of a mixed colour of red and black, and is feathered down to the ends of the toes. See TETRAO.

The redſhank is a ſpecies of the tringa, called by authors gallinula erythropus, and callidrys, and is about the ſize of the common plover. The back is of a greyiſh or browniſh-green, uſually ſpotted with black; its neck grey, and its throat variegated with black and white: the breaſt is white, with a few looſe ſtreaks of black; the wing-feathers are variegated with black, brown, and white; the beak is two fingers breadth long, ſlender, and ſhaped like the beak of a woodcock, rediſh at the baſe, and blackiſh lower down: its legs are of a fine beautiful red, and the hinder toe is very ſhort and ſmall. See TRINGA.

The red-ſtart a ſpecies of the motacilla, with a black throat and reddiſh belly, is of the ſize of a chaffinch, but ſlenderer in proportion to its thickneſs; the head is ſmall, and ſomewhat depreſſed; the the eyes are large; the beak is ſlender, oblong, and of a dark colour; the head, the neck, and the beak, are of a bright grey; the anterior part of the head is

white; the throat and ſides of the head under the eyes are black; the breaſt is of a reddiſh colour, as are alſo the rump and the tail. See plate CCXXIX. fig. 1. The red-breaſt is alſo of the ſpecies of the motacilla, with the throat and breaſt reddiſh; it is of the ſize of the nightingale; the head is pretty large and rounded; the eyes are bright and ſmall; the beak ſlender and brown; the head, neck, and back, are of a pale olive-brown, with a tinge of grey; the throat and breaſt are throughout of a tawny colour, approaching to reddiſh; the belly is white; the wings and tail of the ſame browniſh colour, as are alſo the legs and feet. See plate CCXXIX. fig. 7. where n° 1. is the cock, and n° 2. the hen.

The red-wing is a ſpecies of the turdus, with a white breaſt. It is ſmaller than the common thruſh; the head is ſmall and flatted; the eyes are bright; the iris of a deep hazel; the ears are patulous, and the beak brown, with ſome admixture of yellow: the head, neck, and back, are of a duſky-grey; the ſides and under parts of the wings are of an orange-colour, approaching to red; the breaſt, belly, and throat, are white; the feet are of a paler colour.

RED-RUSSIA, or LITTLE-RUSSIA, a province of Poland, bounded by the province of Poleſia; on the north, by Volhinia and Podolia on the eaſt; by the Carpathian mountains, which divide it from Tranſilvania and Hungary, on the ſouth; and by the province of Little-Poland, on the weſt; being two hundred miles long, and one hundred broad.

RED-SEA ſeparates Aſia from Africa.

RED-BOOK of the Exchequer, an antient record or manuſcript volume, in the keeping of the king's remembrancer, containing divers miſcellany treatiſes relating to the times before the conqueſt.

REDDENDUM, in our law, is uſed ſubſtantively for the clauſe in a leaſe wherein the rent is reſerved to the leſſor. The proper place for it is next after the limitation of eſtate.

REDDIDIT SE, in law, is where a perſon procures bail to action, and the party that is bailed, any time before the return of the ſecond ſcire facias againſt the bail, renders himſelf in their diſcharge: ſuch bail are thereby diſcharged. On a reddidit ſe, the defendant's attorney is to give notice of the render to the plaintiff's attorney, and make oath of ſuch notice, &c. Alſo the bail-piece muſt be diſcharged, otherwiſe the plaintiff may notwithſtanding proceed to judgment and execution againſt the bail; for till that is done there is a record ſtill remains in court againſt them.

REDDITARIUM was antiently uſed for the rental of a manor, or other eſtate; as was

REDDITARIUS, a renter or tenant.

REDDITION, *redditio*, a ſurrendering or reſtoring. In law it alſo denotes a judicial acknowledgment that a thing in queſtion belongs to the demandant.

REDDLE, a ſoft, heavy, red marle, of great uſe in colouring; and being waſhed and freed from its ſand, is often ſold by our druggiſts under the name of bole-armenic. See the article MARLE.

REDEEMABLES, are lands, funds, &c. ſold with a reſervation of the equity of redemption. See REDEMPTION.

REDELIVER, in law, the yeilding and delivering a thing back, which in caſe of a robbery, &c. does not purge the offence.

REDEMISED ſignifies the granting back of lands demiſed or leaſed.

REDEMPTION, in law, a faculty or right of re-entering upon lands, &c. that have been ſold and aſſigned, upon reimburſing the purchaſe money with legal coſts. Bargains wherein the faculty, or, as ſome call it, the equity of redemption is reſerved, are only a kind of pignorative contracts. A certain time is limited within which the faculty of redemption ſhall be exerciſed, and beyond which it ſhall not extend.

In our old law writers, redemption denoted ſome grievous mulct, impoſed by way of commutation for the head or life of the delinquent.

REDENS, REDANS, or REDANT, in fortification, a kind of work indented in form of the teeth of a ſaw, with ſaliant and re-entering angles, to the end that one part may flank or defend another. It is called ſaw-work and indented work. The faces in this flank one another. Redens are frequently uſed in the fortifying of walls, where it is not neceſſary to be at the expence of building baſtions; as when they ſtand on the ſide of a river, a marſh, the ſea, &c.

REDHIBITION, *redhibitio*, in the civil-law, an action allowed a buyer, whereby to annul the ſtate of ſome moveable, and oblige the ſeller to take it back again, upon the buyer's finding it damaged;

or that there was ſome perſonal cheat, *&c.* The redhibition, or redhibitory action, has place in ſeveral caſes in the body of the civil law. If a horſe was ſold that had the glanders, were broken-winded, or foundered, it was a redhibitory caſe; and the buyer would be obliged to take him again within nine days.

REDINTEGRATION, *redintegratio*, in the civil law, the act of reſtoring a perſon to the enjoyment of a thing whereof he had been illegally diſpoſſeſſed.

REDINTEGRATION, in chemiſtry, the reſtoring of any mixt body or matter, whoſe form has been deſtroyed by calcination, corroſion, ſublimation, or the like, to its former nature and conſtitution.

REDISSEISIN, in law, ſignifies a diſſeiſin made by one who once before was found adjudged to have diſſeiſed the ſame perſon of his lands and tenements; in which caſe there lies a ſpecial writ called redisſeiſin. This writ may be brought againſt the perſon who committed the freſh diſſeiſin, and againſt another that was not a diſſeiſor, in caſe he be a tenant of the lands; and if after a recovery upon this writ, the party is diſſeiſed again, by him who made the firſt rediſſeiſin, he ſhall have a new writ, and ſo every time he is rediſſeiſed. On the fact being proved by the ſheriff's inquiſition, the offender is to be impriſoned, and the land reſeiſed.

REDOUBT, or REDOUTE, *reductus*, in fortification, a ſmall ſquare fort, without any defence but in front, uſed in trenches, lines of circumvallation, contravallation, and approach, as alſo for the lodgings of corps de gard, and to defend paſſages. In marſhy grounds, redoubts are frequently made of ſtone-works, for the ſecurity of the neighbourhood; their face conſiſts of from ten to fifteen fathom, the ditch round them from eight to nine feet broad and deep, and their parapets have the ſame thickneſs.

REDRESSING, the rectifying or ſetting any thing ſtrait again.

In a moral ſenſe, to redreſs grievances is to reform and remove them.

To redreſs a ſtag, among hunters, is to put him off his changes.

REDRUTH, a market-town of Cornwall, ſituated fifty miles ſouth-weſt of Launceſton.

REDUBBORS, thoſe who buy ſtolen cloths, *&c.* and, to the end they may not be known, convert them into ſome other form, or change the colour, *&c.*

REDUCE, in chemiſtry, the ſame with reduct. See the article REDUCT.

REDUCE *a place*, among military men, is to oblige the governor to ſurrender it to the beſiegers by capitulation.

REDUCT, or REDUIT, a military term ſignifying an advantageous piece of ground, entrenched, and ſeparated from the reſt of the place, camp, *&c.* for an army, garriſon, *&c.* to retire to in caſe of a ſurprize.

REDUCT, in building, a quirk or little place taken out of a larger to make it more uniform and regular; or for ſome other convenience, as for a little cabinet a ſide of a chimney, for alcoves, *&c.*

REDUCT, or REDUX, among chemiſts, a powder by which calcined metals and minerals are again reduced to their regulus, or pure ſubſtance. See REGULUS.

REDUCTION, *reductio*, in the ſchools, a manner of bringing a term or propoſition which was before oppoſite to ſome other, to be equivalent to it. This is effected by the addition or retrenchment of a negative particle: thus, to reduce this propoſition, *no man is an animal*, to be equivalent to its oppoſite, *every man is an animal*; I drop the negative and ſay, *man is an animal*. After the like manner might the term, *every man*, be reduced, by adding the negative, and ſaying, *there is no man*.

Reduction of propoſitions is uſed in a more general ſenſe for any expreſſion of one propoſition by another propoſition equivalent thereto. To a reduction, therefore, there are two propoſitions required; the reduced, and the reducing, which are conſidered as the extremes thereof, and to be connected in the reduction, by means of the particle, *that is*, which here has the effect of a copula. As here, *only animals think*; *that is*, *animals think, and nothing beſides animals think*; where the propoſition preceding the particle, *that is*, is reduced, and the ſubject of the reduction; that following reduces the particle, and acts as the predicate of reduction; and the particle, *that is*, acts as a copula, importing not barely that the propoſition is expreſſed by another, but by another equivalent one, or, as it were, the ſame.

REDUCTION *of ſyllogiſms*, is a regular changing or transforming of an imperfect ſyllogiſm into a perfect one; or it is a change of a ſyllogiſm in reſpect of form, whereby the neceſſity of the illation

tion or inference is made more evident. See the article SYLLOGISM.

Reduction obtains in ſyllogiſms of the ſecond and third figure, and alſo in the indirect modes of the firſt. By it theſe are all brought to the firſt. There are two kinds of this reduction; the one direct, or oſtenſive, performed merely by a converſion of one, or both the premiſes, or by a tranſpoſition thereof, as when *camectres* is reduced to *celarent*. The other indirect, called per impoſſibile, or ad abſurdum, whereby the perſon who denies the goodneſs or legitimacy of an imperfect ſyllogiſm, is reduced to aſſert or grant ſomething abſurd and impoſſible, or contradictory, to ſome other thing maintained by him: ſuppoſe, *e. gr.* a perſon, granting the premiſes of the following ſyllogiſm, denies the concluſion. *All fraud is prohibited, but ſome trading is not prohibited: therefore ſome trading is not fraud.* We thus proceed againſt him; if the ſyllogiſm is not good, the antecedent is juſt, but the conſequent falſe; and therefore the contrary of the concluſion muſt be true. Now I take the contrary of the concluſion, which you thus give, viz. *all trading is fraud*, and of that, with the other premiſe of the former ſyllogiſm, *viz.* the major, which you likewiſe grant, I make a new ſyllogiſm; thus, *all fraud is prohibited*; *all trading is fraud: therefore all trading is prohibited.* But this propoſition, *all trading is prohibited*, and the other, *ſome trading is prohibited*, which you granted me in the firſt ſyllogiſm, are contradictories.

REDUCTION, in arithmetic, that rule whereby numbers of different denominations are brought into one denomination. Reduction is but the application of multiplication and diviſion. For, firſt, a higher denomination is brought into a lower one, by multiplying the higher denomination with ſo many of the lower, as are contained in the higher; ſtill keeping them equivalent in value. This is called reduction deſcending. Secondly, a lower or inferior denomination is reduced into a higher or ſuperior one, by dividing the leſſer one with ſo many of its denomination as is contained in the greater. This is the converſe of the laſt, and is termed reduction aſcending. See the articles MULTIPLICATION and DIVISION.

The reduction of the principal monies, coins, weights, meaſures, *&c.* antient and modern, foreign and domeſtic, may be found under their reſpective articles MONEY, COIN, WEIGHT, MEASURE, POUND, FOOT, *&c.*

Thus pounds are reduced into ſhillings by multiplying with 20; ſhillings into pence, by multiplying with 12; and pence into farthings, by multiplying with 4. On the other hand, ſhillings are reduced into pounds, by dividing with 20; pence into ſhillings, by dividing with 12; and farthings into pence, by dividing with 4.

Examples. Let it be required to reduce 357l. into ſhillings, and thoſe ſhillings into pence; $357\times20=7140=$ the ſhillings in 357l. and $7140\times12=85680=$ the pence in 357l. as was required. Again, let it be required to reduce 85680d. into ſhillings, and thoſe ſhillings into pounds; $85680\div$ by $12=7140=$ the ſhillings in 357l. and $7140\div$ by $20=357$l. as was required.

If there remain any thing in each diviſion, it is reſpectively either odd pence, ſhillings, or farthings; thus 4123788 farthings, being reduced, give 4295l. 12s. 3d.

But when the numbers propoſed to be reduced are of ſeveral denominations, and it is required to bring them all to the loweſt, you muſt reduce, as before, the higheſt or greateſt denomination to the next leſs, adding the numbers that are of that next denomination together; then reduce their ſum to the next lower denomination; adding together all the numbers that are of that denomination, and ſo proceed gradually on until all is done.

To expedite the practice of this rule, ſeveral compendious ways of reduction have been invented. See PRACTICE.

REDUCTION *of fractions*. See the article FRACTION.

REDUCTION *of equations*, in algebra. See the article EQUATION.

REDUCTION *of curves*. See the article CURVE.

REDUCTION *of a figure, deſign, or draught*, is the making a copy thereof, either larger or ſmaller than the original; ſtill preſerving the form and proportion. The great uſe of the proportional compaſſes is the reduction of figures, *&c.* whence they are called compaſſes of reduction. See the article COMPASS.

There are various methods of reducing figures, *&c.* the moſt eaſy is by means of the pentagraph, or parallelogram:

but

but this has its defects. See the article PENTAGRAPH.

The beſt and moſt uſual methods of reduction are as follows: 1. To reduce a figure, as ABCDE (plate CCXXXI. fig. 1. n° 1.) into a leſs compaſs. About the middle of the figure, as z, pitch on a point, and from this point draw lines to its ſeveral angles A, B, C, &c. then drawing the line *ab* parallel to AB, *bc* parallel to BC, &c. you will have the figure *abcde* ſimilar to ABCDE.

If the figure *abcde* had been required to be inlarged, there needed nothing but to produce the lines from the point beyond the angles, as zD, zC, &c. and to draw lines, *viz.* DC, CB, &c. parallel to the ſides *dc*, *cb*, &c.

2. To reduce a figure by the angle of proportion, ſuppoſe the figure ABCDE (*ibid.* n° 2.) required to be diminiſhed in the proportion of the line AB to *ab*, (*ibid.* n° 3.) draw the indefinite line GH (*ibid.* n° 4.) and from G to H ſet off the line AB. On G deſcribe the arch HI. Set off the line *ab* as a chord on HI, and draw GI. Then with the angle IGH, you have all the meaſures of the figure to be drawn. Thus to lay down the point *c*, take the interval BC, and upon the point G, deſcribe the arch KL. Alſo on the point G deſcribe MN; and upon A, with the diſtance MN, deſcribe an arch cutting the preceding one in *c*, which will determine the ſide *bc*. And after the ſame manner are the other ſides and angles to be deſcribed. The ſame proceſs will alſo ſerve to enlarge the figure.

3. To reduce a figure by a ſcale. Meaſure all the ſides of the figure, as ABCDE, (*ibid.* n° 2.) by a ſcale, and lay down the ſame meaſures reſpectively from a ſmaller ſcale in the proportion required.

4. To reduce a map, deſign, or figure by ſquares. Divide the original into little ſquares, and divide a freſh paper of the dimenſions required into the ſame number of ſquares, which are to be larger or leſs than the former, as the map is to be enlarged or diminiſhed. This done in every ſquare of the ſecond figure, draw what you find in its correſpondent one in the firſt.

REDUCTION *to the ecliptic*, in aſtronomy. The place of any ſtar reduced to the ecliptic, is that point where the ſecundary paſſing through the ſtar interſects the ecliptic. See the articles REDUCTION and SECUNDARY.

REDUCTION, in metallurgy, is the bringing back metalline ſubſtances which have been changed into ſcoriæ or aſhes, or otherwiſe diveſted of their metallic form, into their natural and original ſtate of metals again. All metals and ſemimetals may be reduced by proper management, whatever have been their changes, except only zink, which having been burnt to aſhes, admits of no reduction; but the mixture of gold and ſilver was never yet radically diſſolved by any experiment, whatever ſome may have imagined. Even ſome earths will turn into metals by the admixture and intimate union of a phlogiſtion or inflammable principle.

REDUCTION *into firſt matter*, is a term which alchemiſts uſe when they find their ſubſtances putrify and grow black.

Reduction is more particularly uſed for the converting of a dry matter into a liquid, particularly into water, which by the alchemiſts is held the principle of all things.

REDUCTION, in ſurgery, denotes an operation whereby a diſlocated, luxated, or fractured bone is reſtored to its former ſtate or place. See the articles LUXATION and FRACTURE.

REDUIT, in military affairs. See the article REDUCT.

REDUNDANCY, or REDUNDANCE, a fault in diſcourſe, conſiſting in the uſe of a ſuperfluity of words. Words perfectly ſynonymous are redundant, and ought to be retrenched.

REDUNDANT HYPERBOLA, is a curve of the higher kind, thus called becauſe it exceeds the conic ſection of that name, in the number of its hyperbolical legs; being a triple hyperbola with ſix hyperbolical legs. See HYPERBOLA, CURVE, and CONIC.

REDUPLICATION, in rhetoric, a figure whereby a verſe begins with the ſame word as the preceding one ends with. See the article ANADIPLOSIS.

REDUPLICATION, in logic, a kind of condition expreſſed in a propoſition indicating or aſſigning the manner wherein the predicate is attributed to the ſubject. Hence reduplicative propoſitions, are ſuch wherein the ſubject is repeated with ſome circumſtance or condition. Thus, *men, as men, are rational: kings, as kings, are ſubject to none but God.*

REE, REIS, or REE, a little portugueze copper coin. See the article COIN.

REED,

REED, an antient jewiſh meaſure. See the article MEASURE.

REEF, a term in navigation. When there is a great gale of wind, they commonly roll up part of the ſail below, that by this means it may become the narrower, and not draw ſo much wind; which contracting or taking up the ſail they call a reef, or reefing the ſail: ſo alſo when a top-maſt is ſprung, as they call it, that is, when it is cracked, or almoſt broken in the cap, they cut off the lower piece that was near broken off, and ſetting the other part, now much ſhorter, in the ſtep again, they call it a reefed top-maſt.

REEL, in the manufactories, a machine ſerving for the office of reeling. There are various kinds of reels, ſome very ſimple, others very complex. Of the former kinds thoſe moſt in uſe are, 1. A little reel held in the hand, conſiſting of three pieces of wood, the biggeſt and longeſt whereof (which does not exceed a foot and a half in length, and $\frac{1}{4}$ of an inch in diameter) is traverſed by two other pieces diſpoſed different ways. 2. The common reel, or windlace, which turns upon a pivot, and has four flights traverſed by long pins or ſticks, whereon the ſkain to be reeled is put, and which are drawn cloſer or opened wider, according to the ſkain. A repreſentation of the common reel may be ſeen in plate CCXXIX. fig. 5. where A is the bench or ſeat of the reel, B the two uprights, C the arms of the reel. Its arbor turning and hitching, its little lantern of four notches in the teeth of the wheel; D two wheels, the upper one of which moves the lower, by means of a pinion. E a hammer, the handle whereof is lowered by a peg at the bottom of the lower wheel. F a cord which is rolled round the axle of the lower wheel, and ſupports a weight which ſtops after a certain numbers of turns, to regulate the work-woman.

Other reels uſed in particular arts, as the reel uſed in milling of ſilk, &c. are explained under MILLING, &c. and thoſe in the reeling and winding of ſilks, under the article SILK.

REELING, in the manufactories, the winding of thread, ſilk, cotton, or the like, into a ſkain, or upon a bottom, to prevent its entangling. It is alſo uſed for the charging or diſcharging of bobbins or quills, to uſe them in the manufacture of different ſtuffs, as thread, ſilk, cotton, &c. Reeling is performed different ways, and on different engines. See the article REEL.

RE-ENTRY, in law, ſignifies the reſuming or retaking that poſſeſſion which any one had lately forgone; as where a perſon makes a leaſe of lands to another, the leſſor thereby quits the poſſeſſion, and if the leſſee covenants that upon non-payment of the rent reſerved, the leſſor may lawfully re-enter, being as much as if it was conditioned for the leſſor to take the land again into his hands, and recover the poſſeſſion again by his own act without the aſſiſtance of the law. Likewiſe, if a leaſe for years be made, with condition that if the leſſee aſſign his terms, the leſſor may re-enter, and the leſſee in breach of the condition aſſigns unknown to the leſſor, who accepts of rent from the aſſignee without notice of the aſſignment, in that caſe it is held the leſſor may re-enter, notwithſtanding his acceptance of the rent.

REEVE *of a church*, the guardian of it, or the churchwarden. See CHURCH.

REEVING, in the ſea-language, the putting a rope through a block: hence to pull a rope out of a block, is called unreeving.

RE-EXCHANGE, in commerce, a ſecond payment of the price of exchange, or rather the price of a new exchange due upon a bill of exchange that comes to be proteſted and to be refunded the bearer by the drawer or indorſer. See the articles EXCHANGE and BILL.

RE-EXTENT, in law, a ſecond extent upon lands or tenements, complaint being made that the former was partially executed. See the article EXTENT.

REFECTION, among eccleſiaſtics, a ſpare meal or repaſt juſt ſufficing for the ſupport of life: hence the hall in convents, and other communities, where the monks, nuns, &c. take their refections or meals, in common is called the refectory.

REFERENCE, in writing, &c. a mark relative to another ſimilar one in the margin, or at the bottom of the page, where ſomething omitted in the text is added, and which is to be inſerted either in reading or copying. References are alſo uſed in books where things being but imperfectly handled, the reader is directed to ſome other part or place for a further explanation of them. For the uſe of theſe references in a work of this kind, we refer

refer the reader to what has been ſaid upon that ſubject in our introduction to this work.

REFINING, in general, is the art of purifying a thing; including not only the aſſaying or refining of metals, but likewiſe the clarification of liquors. See ASSAYING and CLARIFICATION.

REFINING *of gold* is performed three ways, *viz.* either with antimony, ſublimate, or aqua fortis; the laſt of which is the moſt uſual, and is called depart, or quartation.

To refine gold with antimony, they make uſe of a wind-furnace, and a common crucible of a ſize anſwerable to the quantity of gold to be refined; always taking care that the gold and antimony, both together, do not fill the crucible more than half full. After the gold is melted in the crucible, the antimony is thrown in in powder: the proportion of the antimony to the gold is eight ounces to a pound, if the gold be between ſixteen and twenty-two carats fine; if it be under ſixteen carats, then they uſe five quarters of a pound to eight ounces of gold; and ſtill the greater quantity of antimony is required, the coarſer the gold is.

As ſoon as they have put the antimony into the crucible, they cover it, and after they have charged the furnace with charcoal, they put on the capital, which is let to ſtand till ſuch time as the crucible is left quite bare; then they take off the capital, and leave the crucible to cool in the furnace of itſelf, till ſuch time as they can take it out by the hand; then they break it, to get out the button or culot, which is a maſs of fine gold remaining at the bottom, with the ſæces of the antimony, the ſilver and copper alloy, and ſometimes little particles of gold itſelf over it.

But notwithſtanding the gold thus prepared is very pure, yet the antimony gives it ſuch a harſh brittle quality, that it ceaſes to be ductile, and muſt be ſoftened by the fire with ſalt-petre and borax, to bring it to itſelf. In order to this operation, they prepare what is called a dry-coppel, which is a coppel made of crucible earth, that does not imbibe like the coppels made of aſhes. When the coppel has been ſufficiently heated in the refining furnace, they put the gold into it, and cover it over with charcoal. As ſoon as the gold is diſſolved, which is very ſoon, by reaſon of the remains of the antimony, they blow it with the bellows to drive the mineral entirely away which now goes off in ſmoak; and add to it, as ſoon as the fumes ceaſe, a little ſalt-petre and borax in powder, which collect the impurities that remained upon the diſſolution, and fix the gold in the coppel in the form of a plate. Then the gold is taken out of the coppel, and melted again in a crucible, with an addition of two ounces of ſalt-petre and borax in powder, to each eight ounces of gold, as ſoon as it has ceaſed to fume; and then it is caſt into an ingot, which upon trial is found to be twenty-three carats, twenty-ſix thirty ſeconds fine.

The particles of gold, detained with the alloy in the ſæces of the antimony, are got out by a dry coppel, with the ſame meltings and ingredients, as were uſed in ſoftening the former: and when they are certain, by the aſſay, how much gold that matter contains, they refine it to ſeparate the copper, and afterwards make the depart or quartation. See the article QUARTATION.

As for the gold which may be left ſticking to the dry coppels, it is got by breaking and pulverizing the crucibles, and by repeated waſhings of the powder of them.

The method of refining gold, by means of ſublimate, is this: they begin the proceſs like that with antimony; that is, in the ſame furnace, with the ſame coal, the ſame fire, and the ſame crucibles. When the gold is melted in the crucible, they caſt in the ſublimate, not in powder, but only broken into pieces: the proportion is, if the gold be of twenty-two carats, an ounce or an ounce and a half, or even two ounces of the ſublimate to eight ounces of the gold; if of twenty carats, three ounces; and if it be only from eighteen to twelve, five or ſix ounces of the ſublimate to eight of the gold, in which laſt caſe they part the ſublimate into two, and put in one half at a time with the gold into a new crucible; which, when the operation is over, leaves the gold of eighteen or twenty carats, according as it was in fineneſs before. This done, they put the broken ſublimate into a crucible with the melted gold, covering it immediately to ſmother the mineral; and then fill the furnace with charcoal, having firſt put on the capital; after a quarter of an hour they take off the capital, lay the crucible bare, and blow off all the aſhes and other impurities, that may be floating on the liquid gold, with

a pair of bellows. This is repeated again and again, till the impurities of the gold are carried off by the ſublimate, appearing of a bright glittering colour; after which being taken out of the crucible, it is caſt into an ingot.

This method of refining by ſublimate, is both cheaper and more complete than that by antimony; but they are both exceeding dangerous, by reaſon of the ſulphureous and arſenical exhalations; on which account the method by quartation is moſt practiſed. See the article QUARTATION.

REFINING *of ſilver* is performed two ways; one with lead, and the other with ſalt-petre.

In order to refine ſilver with lead, a coppel is filled with a mixture of brick-aſhes and aſhes of bullock's and other bones.

It is ſet on the fire, and heated red-hot; in which ſtate the ſilver and lead are put in together, in the proportion of a pound of lead to eight ounces of ſilver, and even ſomewhat more lead, if the ſilver be very coarſe.

As theſe two metals melt together, the copper before mixt with the ſilver diſſipates into ſmoak, or goes away with the ſcum; and ſo does the lead itſelf, leaving the ſilver alone in the coppel in its proper degree of fineneſs.

In this method of refining, wherein ſix or ſeven thouſand pounds may be refined at once, the metal is drawn out of the coppel two ways; the one by plunging in it, while ſtill liquid, a thick bar of iron, round which the ſilver ſticks in form of a ſhell or cruſt, repeating this again and again; the other is by letting the coppel ſtand till it is cold; in the bottom of which, the ſilver fixes in form of a cake.

This method of refining ſilver with lead, is both the beſt and the cheapeſt: however, for want of workmen who underſtand it, that with ſalt-petre ſtill obtains in many places; which is performed in a wind-furnace. They firſt reduce the ſilver to be refined into grains, about the ſize of a ſmall pea; which is done by firſt melting it, then throwing it into a tub of common water, and then heating it over again in a boiler. This being done, they put it into a crucible; putting to every eight ounces of ſilver two of ſalt-petre. Then they cover the crucible with an earthen lid (in the form of a dome) exactly luted; which lid, however, muſt have a little aperture in the middle. The crucible being ſet into the furnace, and covered with charcoal, which is only to be lighted by degrees, at length they give it the full force of the fire, to put the metal into a perfect fuſion. This is repeated three times ſucceſſively, at an interval of a quarter of an hour. After the third fire they uncover the furnace, and let the crucible cool; and at length break it, to get out the ſilver, which is found in a button or culot, the bottom of which is very fine ſilver; and the top mixed with the fæces of the ſalt-petre, and the alloy of the ſilver, and even ſome particles of fine ſilver. Then they ſeparate the culot from the impurities, and melt it in a new crucible; and throw charcoal-duſt into the diſſolution, and work the whole briſkly together. Then they cover the crucible up again, charge the furnace with coal, and give it a ſecond fire.

Having done this, they blow off the aſhes and impurities with bellows, from off the top of the metal, till it appears as clear as a looking-glaſs; and then they throw in an ounce of borax broken to pieces. Then, in the laſt place, they cover the crucible up again, and give it the laſt fire, and after this caſt it into ingots, which are found eleven penny-weight and ſixteen grains fine. To recover the ſilver that may be left in the fæces and ſcoria, they pound them, and give them repeated lotions in freſh water.

REFINING of ſugar, ſulphur, camphor, nitre, *&c.* See SUGAR, CAMPHOR, *&c.*

REFLECTING, or REFLECTIVE DIAL. See the article DIAL.

REFLECTION, or REFLEXION, in mechanics, the return or regreſſive motion of a moving body, occaſioned by ſome obſtacle which hindered it from purſuing its former direction.

For the laws of the reflection of moving bodies, ſee MOTION, COMMUNICATION *of motion*, and PERCUSSION.

REFLECTION *of the rays of light*, in catoptrics, is their return, after approaching ſo near the ſurfaces of bodies, as to be thereby repelled, or driven backwards. Thus the ray A B (plate CCXXX. fig. 2. n° 1.) proceeding from the radiant A, and ſtriking on the point B of the ſpeculum or plane D E, being returned thence to C; B C repreſents the reflected ray, and B the point of reflection; in reſpect whereof A B repreſents the incident ray, or ray of incidence, and B the point of incidence. See MIRROUR.

Again,

Fig. 1. REDUCTION.

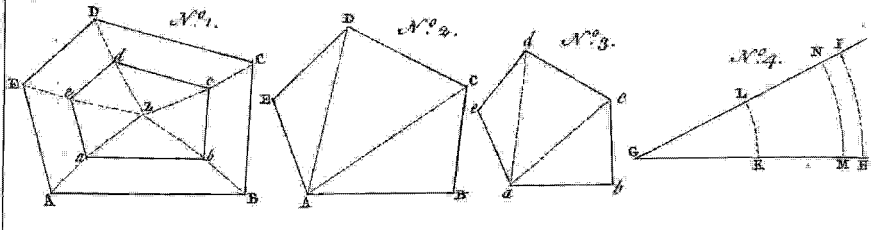
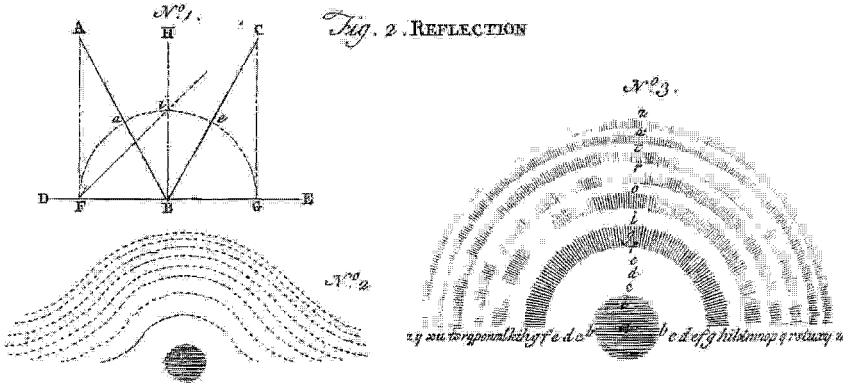


Fig. 2. REFLECTION



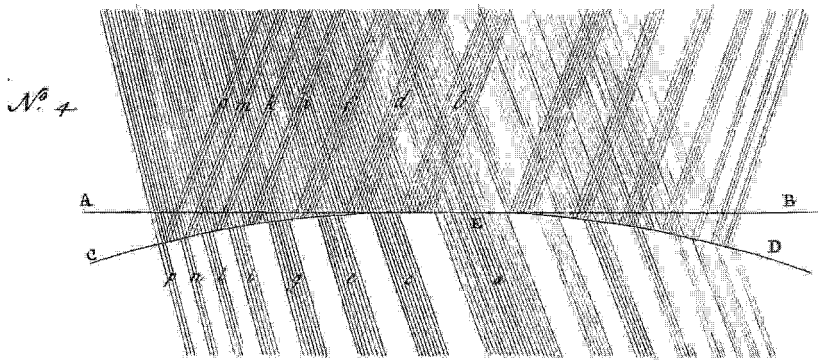
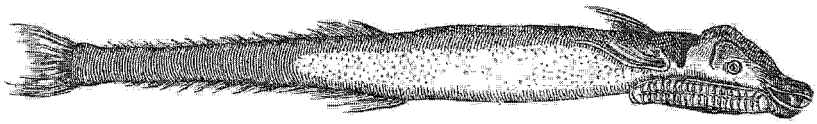


Fig 3. The REMORA.



Again, a line, as C G, drawn from any point, as C, of the reflected ray B C, perpendicular to the ſpeculum, is called the cathetus of the reflection, or cathetus of the eye; as a line, A F, drawn from the radiant perpendicular to the ſpeculum, is called the cathetus of incidence.

Of the two angles which the reflected ray B C makes with the mirrour, the ſmalleſt, C B E, is called the angle of reflection; as, of the two angles the incident ray makes with the ſpeculum, the ſmalleſt, A B D, is called the angle of incidence.

If the mirrour be either concave or convex, the ſmalleſt angles the ray makes with a tangent to the point of reflection and incidence, are the angles of reflection and incidence.

The angle C B H, which the reflected ray makes with a perpendicular to the point of reflection, is called the inclination of the reflected ray; as the angle A B H is called the inclination of the incident ray.

The great law of reflection is, that the angle of reflection, C B E, is always equal to the angle of incidence, A B D, as has been demonſtrated under the article INCIDENCE.

The rays of light are found by experiment to be differently reflexible, in the ſame manner, and for the ſame reaſon, that they are differently refrangible; or that thoſe rays which were leaſt and moſt refrangible, were alſo leaſt and moſt reflexible; and, conſequently, exhibit the ſame colours, and in the ſame order. See the article COLOUR.

Cauſes of the REFLECTION *of light.* The opinions of philoſophers, relating to the cauſe of this difficult phænomenon, being principally four, are thus ſtated by Mr. Rowning. 1. It was the opinion of philoſophers, before Sir Iſaac Newton diſcovered the contrary, that light is reflected by impinging upon the ſolid parts of bodies. But that this is not the caſe, will appear from the following reaſons: and, firſt, it is not reflected at the firſt ſurface of the body, by impinging againſt; for it is evident, that in order to the due and regular reflection of light, that is, that the reflected rays ſhould not be diſperſed and ſcattered one from another, there ought to be no raſures or unevenneſs in the reflecting ſurface large enough to bear a ſenſible proportion to the magnitude of a ray of light: becauſe, if the ſurface abounds with ſuch, the reflected rays will rather be ſcattered like a parcel of pebbles thrown upon a rough pavement, than reflected with that regularity with which light is obſerved to form a well poliſhed one, which are far from being ſo; for to poliſh is no other than to grind off the larger eminences and protuberances of the metal with the rough and ſharp particles of ſand, emery, or putty, which muſt of neceſſity leave behind them an infinity of raſures and ſcratches, which, though inconſiderable with regard to the former roughneſſes, and too minute to be diſcerned by us, muſt, nevertheleſs, bear large proportion to, if not vaſtly exceed, the magnitude of the particles of light.

Secondly, that it is not reflected by impinging upon the ſolid particles which conſtitute this ſecond ſurface, is ſufficiently clear from the foregoing argument; the ſecond ſurfaces of bodies being as incapable of a perfect poliſh as the firſt; and it is farther confirmed from hence, *viz.* that the quantity of light reflected, differs according to the different denſity of the medium behind the body: and that it is not reflected by impinging upon the particles which conſtitute the ſurface of the medium behind it, is evident, becauſe the ſtrongeſt reflection of all at the ſecond ſurface of the body, is when there is a vacuum behind it.

2. It has been thought by ſome, that it is reflected at the firſt ſurface of a body, by a repulſive force equally diffuſed over it, and at the ſecond by an attractive force.

If there be a repulſive force diffuſed over the ſurface of bodies, that repels rays of light at all times, then, ſince by increaſing the obliquity of a ray, we diminiſh its perpendicular force (which is that only whereby it muſt make its way through this repulſive force) however weakly that force may be ſuppoſed to act, rays of light may be made to fall with ſo great a degree of obliquity on the reflecting ſurface, that there ſhall be a total reflection of them there, and not one particle of light be able to make its way through, which is contrary to obſervation; the reflection of light at the firſt ſurface of a tranſparent body being never total in any obliquity whatever. The hypotheſis, therefore, in this particular, muſt be falſe.

As to the reflection at the ſecond ſurface by the attractive force of the body, this may be conſidered in two reſpects, *viz.*

when the reflection is total, and when it is partial.

And firſt, in caſes where the reflection is total, the cauſe of it, undoubtedly, is that ſame attractive force by which light would be refracted in paſſing out of the ſame body: this is manifeſt from that analogy which is obſervable between the reflection of light at this ſecond ſurface and its refraction there. For, otherwiſe, what can be the reaſon that the total reflection ſhould begin juſt when the obliquity of the incident ray, at its arrival at a ſecond ſurface, is ſuch, that the refracted angle ought to be a right one; or when the ray, were it not to return in reflection, ought to paſs on parallel to the ſurface, without going from it? For, in this caſe, it is evident, that it ought to be returned by this very power, and in ſuch manner, that the angle of reflection ſhall be equal to the angle of incidence: juſt as a ſtone thrown obliquely from the earth, after it is ſo far turned out of its courſe by the attraction of the earth, as to begin to move horizontally, or parallel to the ſurface of the earth, is then, by the ſame power, made to return in a curve ſimilar to that which is deſcribed in its departure from the earth, and ſo falls with the ſame degree of obliquity that it was thrown with.

But, ſecondly, as to the reflection at the ſecond ſurface, when it is partial; an attractive force uniformly ſpread over it, as the maintainers of this hypotheſis conceive it to be, can never be the cauſe thereof, becauſe it is inconceivable, that the ſame force, acting in the ſame circumſtances in every reſpect, can ſometimes reflect the violet coloured rays and tranſmit the red, and at other times reflect the red and tranſmit the violet.

This argument concludes equally againſt a repulſive force uniformly diffuſed over the firſt ſurface of a body, and reflecting light there; becauſe ſome bodies reflect the violet and tranſmit the red, others reflect the red and tranſmit the violet at their firſt ſurface; which cannot poſſibly be upon this ſuppoſition, the rays of whichever of theſe colours we ſuppoſe to be the ſtrongeſt.

3. Some being apprehenſive of the inſufficiency of a repulſive and attractive force diffuſed over the ſurface of bodies, and acting uniformly, have ſuppoſed, that by the action of light upon the ſurfaces of bodies, the matter of theſe forces is put into an undulatory motion, and that where the ſurface of it is ſubſiding, light is tranſmitted, and in thoſe places where it is riſing, light is reflected. But this ſeems to advance us not one jot farther; for in thoſe caſes, ſuppoſe where red is reflected and violet tranſmitted, how comes it to paſs that the red impinges only on thoſe parts when the waves are riſing, and the violet when they are ſubſiding?

4. The laſt hypotheſis is that of Sir Iſaac Newton; who is of opinion, that light, in its paſſage from the luminous body, is diſpoſed to be alternately reflected by, and tranſmitted through, any refracting ſurface it may meet; and this diſpoſition he calls fits of eaſy reflection, and eaſy tranſmiſſion. Thus, if we take the diſtances as the numbers 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, &c. then at the diſtances 0, 2, 4, 6, 8, &c. the light will be tranſmitted; and, at the diſtances 1, 3, 5, 7, 9, &c. it will be reflected in coloured rings.

Theſe fits he thinks probably owing to ſome ſubtile and elaſtic ſubſtance, diffuſed through the univerſe, in the following manner: as bodies falling into water or paſſing through the air, cauſe undulations in each, ſo the rays of light may excite vibrations in this elaſtic ſubſtance: the quickneſs of which vibrations depending on the elaſticity of the medium, the motion of the particles of it may be quicker than that of the rays; and therefore, when a ray, at the inſtant it impinges upon any ſurface, is in that part of a vibration of this elaſtic ſubſtance which conſpires with its motion, it may be eaſily tranſmitted; and when it is in that part of a vibration which is contrary to its motion, it may be reflected. Alſo, when light falls on the firſt ſurface of a body, none is reflected there; but all that happens to it there is, that every ray that is not in a fit of eaſy tranſmiſſion is there put into one, ſo that, when they come to the other ſide, the rays of one colour ſhall be in a fit of eaſy tranſmiſſion, and thoſe of another in a fit of eaſy reflection, according to the thickneſs of the body, the intervals of the fits being different in rays of a different kind.

This doctrine of the eaſy reflection and eaſy tranſmiſſion of the rays of light, ought by no means to be looked on as a mere hypotheſis, ſince Sir Iſaac has evinced, by experiments, that this is the caſe.

caſe. The firſt experiment he mentions is the compreſſion of two priſms hard together, whoſe ſides were a little convex, by which means they touched by a ſmall part of their ſurfaces, and contained every where elſe a thin plate of air, as it may be properly called, whoſe thickneſs did every where gradually increaſe from the touching parts. He obſerved the place where they touched became abſolutely tranſparent, as if they had there been one continued piece of glaſs. For when the light fell ſo obliquely on the plate of air between the priſms as to be all reflected, it ſeemed in that place of contact to be wholly tranſmitted, inſomuch that when looked upon, it appeared like a black or dark ſpot, by reaſon that little or no ſenſible light was reflected from thence, as from other places. When he looked through the priſms, this place of contact ſeemed, as it were, a hole in the plate of air; and through this hole objects that were beyond might be ſeen diſtinctly, which could not be ſeen through other parts of the glaſſes where the air was interjacent. By harder compreſſion the ſpot was dilated by the yielding inwards of the parts of the glaſſes.

When the plate of air, by turning the priſms about their common axis, became ſo little inclined to the incident rays that ſome of them began to be tranſmitted, there aroſe in it many ſlender coloured arches, which at firſt were ſhaped almoſt like the conchoid, as in *ibid.* n° 2. and by continuing the motion of the priſms, theſe arches increaſed and bended more and more about the ſaid tranſparent ſpot, till they were compleated into circles or rings encompaſſing it; and afterwards continually grew more and more contracted. Theſe arches and rings became tinged with various colours, as the motion of the priſms was continued, being at firſt of a violet and blue; afterwards of a white, blue, violet; black, red, orange, yellow, white, blue, violet, &c. after this the coloured rings contracted, and became only black and white. The priſms being farther moved about, the colours all began to emerge out of the whiteneſs, and in a contrary order to what they had before.

But to obſerve more nicely the order of the colours which aroſe out of the white circles, as the rays became leſs and leſs inclined to the plate of air, Sir Iſaac Newton made uſe of the two object-glaſſes, one a plano-convex, and the other a double-convex, of the ſame ſphericity on both ſides, of fifty one feet focal diſtance; and upon this he laid the plane ſide of the other, preſſing them ſlowly together to make the colours ſucceſſively emerge in the middle of the circles, and then ſlowly lifted the upper glaſs from the lower to make them ſucceſſively vaniſh again in the ſame place. Upon compreſſion of the glaſſes, various colours would emerge and ſpread into concentric circles or rings of different breadths and tints encompaſſing the central ſpot. Their form, when the glaſſes were moſt compreſſed, is delineated, *ibid.* n° 3. where *a* is the central black ſpot, and the circuits of colours from thence outwards as follows:

1 { *b*, blue. *c*, white. *d*, yellow. *e*, red.
2 { *f*, violet. *g*, blue. *h*, green. *i*, yellow. *k*, red.
3 { *l*, purple. *m*, blue. *n*, green. *o*, yellow. *p*, red.
4 { *q*, green. *r*, red.
5 { *s*, greeniſh blue. *t*, red.
6 { *u*, greeniſh blue. *x*, pale red.
7 { *y*, greeniſh blue. *z*, reddiſh white.

Theſe rings were obſerved to be leaſt when the eye was held perpendicularly over the glaſſes in the axis of the rings: whereas, viewed obliquely, they became bigger, continually ſwelling as the eye was removed farther from the axis: and the coloured rings made in air, became much more diſtinct and viſible, when viewed in a dark room by the reflection of the coloured light of the priſm. The rings made by reflection of red light were manifeſtly bigger than thoſe made by the blue and violet; and it was very pleaſant to ſee them gradually ſwell and contract according as the colour of the light was changed. The motion was quickeſt in the red, and ſloweſt in the violet; and, by an eſtimation made of the diameters of the rings, the thickneſſes of air in the places where the rings are made by the limits of the ſeven colours, red, orange, yellow, green, blue, indigo, violet, ſucceſſively in order, were to one another as the cube roots of the ſquares of the eight lengths of a chord which ſound the notes of an octave, that is, of the numbers $1, \frac{8}{9}, \frac{5}{6}, \frac{3}{4}, \frac{2}{3}, \frac{3}{5}, \frac{9}{16}, \frac{1}{2}$.

Theſe rings were not of various colours, as thoſe made in the open air, but appeared all over of that priſmatic colour only with which it was illumined; and by

by throwing the coloured light directly on the glaſſes, that which fell on the dark ſpaces between the rings was tranſmitted through the glaſſes without any variation of the colour. This appeared by placing a white paper behind, on which the rings were painted of the ſame colour as thoſe by reflected light, and of the bigneſs of their immediate ſpaces. Hence the origin of theſe rings is manifeſt; namely, that the air between the glaſſes, according to its various thickneſs, is diſpoſed in ſome places to reflect, in others to tranſmit the light of any one colour; and in the ſame place to reflect that of one colour, where it tranſmits that of another; in the manner as you ſee repreſented *ibid.* n° 4. where AB, CD, are the glaſſes, as before; and *a*, *c*, *e*, *g*, *i*, *l*, *n*, *p*, the parts of the beam tranſmitted; and *b*, *d*, *f*, *h*, *k*, *m*, *o*, the parts of the beam reflected, making the coloured rings.

REFLECTION *of the moon*, the ſame with her variation. See VARIATION.

REFLECTION is alſo uſed, figuratively, for an operation of the mind; whereby it turns its view backwards as it were upon itſelf, and makes itſelf and its own operation the object of its diſquiſition; and by contemplating the manner, order, and laws which it obſerves in perceiving ideas, comparing them together, reaſoning, &c. it frames new ideas of the relations diſcovered therein. See the articles IDEA, KNOWLEDGE, REASONING, &c.

REFLEX, or REFLECT, in painting, is underſtood of thoſe places in a picture which are ſuppoſed to be illuminated by a light reflected from ſome other body, repreſented in the ſame piece.

REFLEX VISION, that performed by means of reflected rays, as from mirrours. See the articles VISION, REFLECTION, and MIRROUR.

REFLUX *of the ſea*, the ebbing of the water, or its returning from the ſhore. See the article TIDE.

REFORM, a re-eſtabliſhment, or revival of formerly neglected diſcipline, or a correction of the reigning abuſes therein.

To REFORM, in a military ſenſe, is to reduce a company, regiment, &c. either by diſbanding the whole, or breaking a part, and retaining the reſt.

REFORMADO, or REFORMED OFFICER, one whoſe troop, or company, is ſuppreſſed in a reform, and he continued either in the whole or half-pay, doing duty in the regiment.

REFORMATION, the act of reforming, or correcting an error or abuſe in religion, diſcipline, or the like.

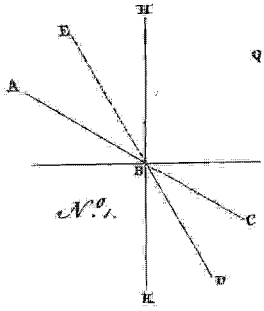
The reformation, ſo called by way of eminence, is the ſeparation of the proteſtants from the church of Rome, in the beginning and towards the middle of the ſixteenth century. See the article LUTHERANS, &c.

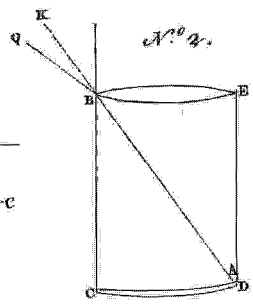
REFRACTED, or REFRACTIVE DIAL, one that ſhews the hours by means of ſome refractive tranſparent fluid. See the article DIAL.

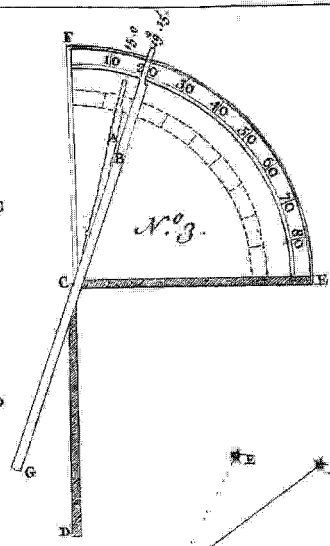
REFRACTION, in general, is the deviation of a moving body from its direct courſe, occaſioned by the different denſity of the medium it moves in; or, it is a change of direction, occaſioned by a body's falling obliquely out of one medium into another of a different denſity. The great law of refraction, which holds in all bodies, and all mediums, is, that a body, paſſing obliquely out of one medium into another wherein it meets with leſs reſiſtance, is refracted or turned towards the perpendicular; and, on the contrary, in paſſing out at one medium into another wherein the reſiſtance is greater, it is refracted or turned from the perpendicular. Hence the rays of light, falling out of air into water, are refracted towards the perpendicular; whereas a ball, thrown into the water, is refracted from it. Now the reaſon of this difference is, that water, which reſiſts the motion of light leſs than air, reſiſts that of the ball more; or, to ſpeak more juſtly, becauſe water, by its greater attraction, accelerates the motion of the rays of light more than air does.

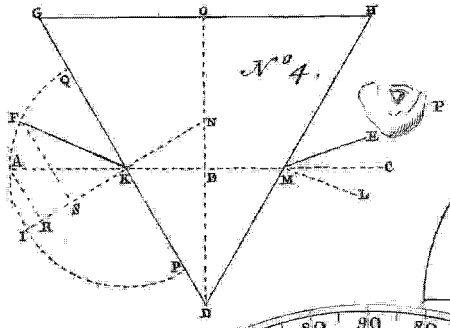
In order to illuſtrate the refraction of light, let AB (plate CCXXXI. fig. 1. n° 1.) repreſent a ray moving in air from A to B, and paſſing into water at B; and let HK be perpendicular to the ſurface of the water at the point B. When therefore the ray enters the water, it does not continue its motion ſtraight forward in the line BC, but in ſome other line, as BD, which is nearer or more inclined to the perpendicular BK: and, on the other hand, if the line DB be ſuppoſed to be a ray of light moving in water from D to B, and there paſſing into air, inſtead of continuing its motion ſtraight forward in the direction BE, it goes on in ſome other direction as BA; which being

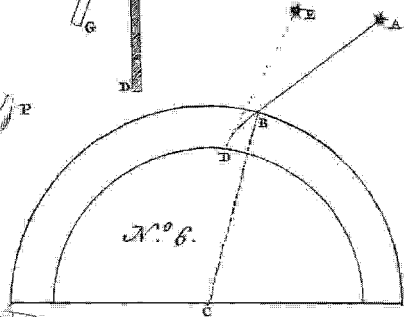
Fig. 1. REFRACTION.











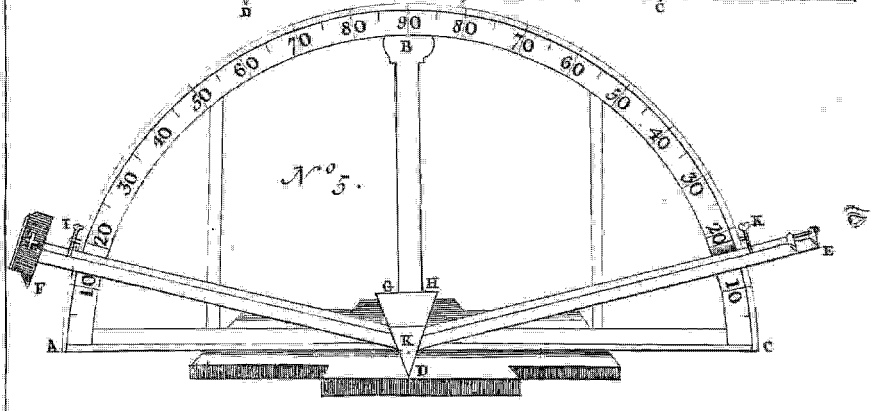


Fig. 2.
REGULAR BODIES.

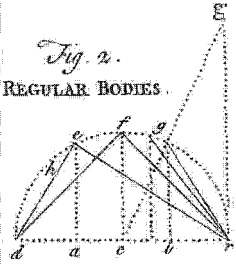


Fig. 3. The REGULUS without a Creſt.

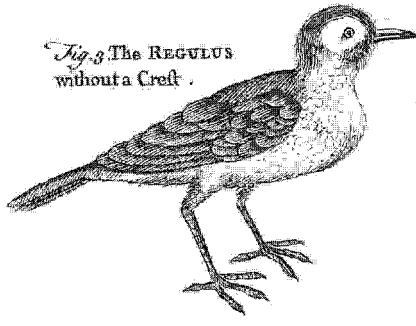
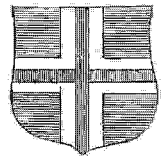


Fig. 4. RESARCELÉE



being leſs inclined to, is more diſtant from, the perpendicular B H, as will appear from the following experiment. Let an empty veſſel, as B C D E (*ibid.* n° 2.) have a ſmall object placed at its bottom at A; and let it be ſo ſituated as that the ſight of the object may be intercepted by the ſide of the veſſel, from an eye placed at Q; then let the veſſel be filled with water, and the ray A B, which before the water was poured in, moved in a right line from A to K, and by ſo doing paſſed above the eye, will, upon its emerſion out of the water be bent downward, ſo as to ſtrike upon the eye at Q, and thereby render the object at A viſible. This bending of the rays of light, in their paſſage out of one medium into another, is owing to the attractive force of the denſer medium acting upon the rays at right angles to the ſurface.

The fundamental law of the refraction of the rays of light is, that the ſine of the angle of incidence is always in a conſtant ratio to the ſine of the angle of refraction, in all inclinations of the incident ray whatever. See INCIDENCE.

Now that this is the caſe, whatever be the inclination of the incident ray, may be proved experimentally in the following manner: let a braſs quadrant, C F E, (*ibid.* n° 3.) graduated on both ſides, and fixed at its center C, to a perpendicular pillar, C D, have two indices, A and B, one on each ſide, moveable on the center C; and let the index A, whereof the ſtem G is a continuation, be made to point to the fifteenth degree, and the index B to the fifteenth minute of the twentieth degree: let then the pillar be immerſed in water, till C E, the horizontal edge of the quadrant touch the ſurface of the water; and upon viewing the ſtem G, immerſed in the water, it will, by reaſon of the refraction, appear to have changed its ſituation, and to lie in a line with the index B. And the ſame thing will likewiſe obtain, if the index A be ſet at the thirtieth degree, and B at the thirtieth minute of the forty ſecond degree; that is, twenty-five, the ſine of the leſſer angle of incidence, is to thirty-three, the ſine of the correſponding angle of refraction; as fifty, the ſine of the greater angle of incidence, is to ſixty-ſix, the ſine of the angle of refraction correſponding thereto. And the ſame holds of all other angles of incidence and refraction.

Since then the ratio of theſe ſines is conſtant, it remains that we determine what that ratio is in different mediums; in order to which we ſhall firſt premiſe the following lemma. Let G H D, (*ibid.* n° 4.) be an equilateral triangle, and let the angle D be biſſected by the right line D O; let A K, M C, be drawn parallel to the ſide G H, and through the point K draw I K N cutting O D in N: then is the angle A K I = N K B. Alſo the triangle is divided into two ſimilar and equiangular triangles, N K B and B K D, by the perpendicular K B; and, therefore, the angle N K B is equal to the angle K D B: all which is evident from Euclid's Elements.

Suppoſe now that G H D be the ſection of a priſm of water or glaſs, or any pellucid medium; and K M a ray of light paſſing through it, parallel to the ſide G H; and let it go out of the priſm, and be refracted into the air, on each ſide, into the directions K F, M E: and, laſtly, upon the point K, deſcribe the ſemi-circle P I Q: then is N K B (= K D B) = F K I, the angle of incidence out of the priſm into air, and A K I is the angle of refraction; conſequently A R, and F S, are the ſines of the angles of incidence and refraction, out of the priſm into air. On the contrary, we may conſider F K as the incident ray falling upon the priſm in the point K, and refracted in the direction K M, parallel to the ſide G H, which at the point M emerges again into the air in the direction M E, making the angle E M L, with the perpendicular M L, equal to the angle F K I. In this caſe the angle F K I is the angle of incidence, and N K B is the angle of refraction in the priſm; which angle of refraction is therefore given, or conſtant, as it is always equal to the angle K D B, or half the angle of the priſm.

The angle of incidence, F K I, conſiſts of two parts, *viz.* of the given angle A K I (= K D B) and the additional angle A K F. Now the angle A K I is known, as being equal to half the angle of the priſm; and the angle F K A is known by placing the priſm by the center of a graduated ſemi-circle, as A B C, (*ibid.* fig. 5.) carrying an index, whoſe two arms, F K and K E are equally elevated above the horizontal line A C, and

and correſpond to the incident and emergent ray FK and ME in the other figure. For here it is evident, if an object be placed on the end of the arm F, it will be ſeen by an eye looking through the ſights at the other end of the index E; and when the object is thus ſeen, the angle AKF is known by the number of degrees which each arm cuts upon the limb of the ſemi-circle.

This number of degrees, added to the conſtant number thirty degrees, which is equal to half the angle of the priſm, gives the whole angle of incidence FKI; and thus the angle of incidence and refraction being found, the proportion of the ſines FS and AR will be diſcovered, which ratio is always the ſame while the matter of the priſm remains the ſame, as was before ſhewn from the theory, and may by this inſtrument be proved by experiment. For example, let the priſm be of water, it will be neceſſary to elevate each arm twelve degrees upon the limb, before the image of the object at F can be ſeen by the eye at E; then $12 + 30 = 42^{\circ} = FKA + AKI = FKI$, the angle of incidence. But the ſine FS of 42°, is to the ſine AR of 30°, as 4 to 3 very nearly.

Now it is plain, if the ratio of the ſines AR and FS were not fixed, ſince FS might be in any ratio greater or leſs than AR, the incident ray FK may make an angle FKI greater or leſs than forty-two degrees, and yet the object at F be ſeen by the eye at E: but this we find by experiment to be impoſſible, becauſe there is no elevation of the arms of the index that will exhibit the appearance of the object but the one above-mentioned.

If GHD were a priſm of glaſs, as that is a denſer body than water, ſo its refractive power will be greater; and, conſequently, it will act more ſtrongly on the ray KM, at its exit into the air, and cauſe it to be refracted farther from the perpendicular IK or ML. Therefore the angle of incidence out of air into glaſs, *viz.* FKI, ought to be greater, and ſo to require a greater elevation of the legs of the index than before in the priſm of water: and this we find, by experiment, is the caſe; ſince then the elevation, inſtead of twelve degrees, muſt be about twenty-two or twenty-three degrees.

Hence it is plain, the ſine of incidence, FS, muſt be in a conſtant ratio to the ſine of refraction, AR; becauſe the angle AKL is invariable, being always equal to GDO; and in the ſame medium, GDH, the angle FKI muſt always be the ſame, becauſe the refractive power is every where ſo: therefore, the angles being conſtant, the ſines will be ſo too, or their ratio to each other always the ſame. And as by this inſtrument the angles of incidence and refraction are diſcovered, the ratio of their ſines will be known of courſe, for each reſpective medium: thus, in water the ſine of forty-two degrees, is to the ſine of thirty degrees, nearly as four to three; in glaſs, the ſine of forty-ſix degrees is to the ſine of thirty degreee, as three to two; or, more nearly as ſeventeen to eleven: and, to mention no more, it has been found, by ſome experiments, that the ſine of incidence is to the ſine of refraction in a diamond, as five to two. But, ſince in phyſical matters no authority is comparable to that of Sir Iſaac Newton, we ſhall give a table from his optics, ſhewing the proportion of the ſines of incidence and refraction of yellow light, that being nearly a mean between the greateſt and leaſt refrangible rays: this is contained in the firſt column; the ſecond column expreſſes the denſities of the bodies eſtimated by their ſpecific gravities; and the third ſhews the refractive power of each body, in reſpect of its denſity.

The refracting body.	Proportion of the ſines.	The denſity	Ref. power
Air	3201 to 3200	0,0012	5208
Glaſs of ant.	17 to 9	5,2800	4864
Pſeudo-topaz	23 to 14	4,2700	3979
A ſelenites	61 to 41	2,2520	5386
Com. glaſs	31 to 20	2,5800	5436
Cryſt. of rock	25 to 16	2,6500	5450
Iſland cryſt.	5 to 3	2,7200	6536
Sal gemmæ	17 to 11	2,1430	6477
Alum	35 to 24	1,7140	6570
Borax	22 to 15	1,7140	6716
Nitre	32 to 21	1,9000	7079
Dantzick vit.	303 to 200	1,7150	7551
Oil of vitriol	10 to 7	1,7000	6124
Rain-water	529 to 396	1,000	7854
Gum-arabic	31 to 21	1,3750	8574
Spirit of wine rectified	100 to 73	0,8660	10121
Camphor	3 to 2	0,9960	12551
Oil-olive	22 to 15	0,9130	12607
Linſeed-oil	40 to 27	0,9320	12819
Spt. of turp.	25 to 17	0,8740	13222
Amber	14 to 9	1,0400	13654
A diamond	100 to 41	3,4000	14556

The refraction of the air in this table is determined by that of the atmoſphere, as obſerved by aſtronomers; for if light paſs through many refracting ſubſtances, or mediums, gradually denſer and denſer, and terminated with parallel ſurfaces, the ſum of all the refractions will be equal to the ſingle refraction it would have ſuffered in paſſing immediately out of the firſt medium into the laſt.

As to the different refrangibility of the ſeveral ſorts of rays of light, it has already been explained under the articles COLOUR and RAINBOW.

REFRACTION, in aſtronomy. From what has been ſaid, the refraction of the rays of light, iſſuing from a heavenly body, in paſſing through the atmoſphere of our earth, will be eaſily underſtood. Thus, the ray AB (*ibid.* n° 6.) proceeds from the ſtar A in a right line, till it reach the atmoſphere of the earth at B; upon entering which, it will be refracted towards the perpendicular BC, ſuppoſed to be drawn from B to C, the center of the earth; and as it paſſes on through the atmoſphere towards it, D, it will be continually refracted the ſame way, by reaſon it all along enters a denſer part of the atmoſphere; and hence it will deſcribe the curve BD bending downwards, ſo as to render the object viſible to a ſpectator at D. But, as all viſion is performed in right lines, the ſpectator at D will ſee the ſtar in the tangent line DE; and, conſequently, the apparent place of the ſtar will be E; which is higher, or nearer the zenith than its true place A.

From hence it is, that the ſun, moon, and ſtars appear above the horizon when juſt below it; and higher than they ought to do when they are above it.

Farther, the refraction of the heavenly bodies is greateſt in the horizon, and gradually decreaſes as their altitudes increaſe, till near the zenith it becomes ſcarcely ſenſible, and in the zenith none at all. In taking, therefore, the altitudes of the heavenly bodies, it is abſolutely neceſſary to ſubtract from the obſerved altitude their refractions, a table of which we have given under the article QUADRANT. Refraction ſerves alſo to account for the oval appearance of the ſun and moon near the horizon: for the lower theſe objects are, the greater is the obliquity with which their rays enter the atmoſphere, or paſs from the nearer to the denſer parts of it; and, therefore, they appear to be the more elevated by refraction; ſo that, when very near the horizon, the lower part of them is thereby more elevated than the upper part: and hence they appear of an oval figure, by reaſon their horizontal diameters are no ways altered, while their vertical or upright diameters are ſhortened by the different refraction of the upper and lower limbs. There is alſo another alteration made by refraction in the apparent diſtance of ſtars: thus, if two ſtars are in the ſame circle of altitude, their apparent diſtance is leſs than the true; for ſince refraction makes each of them higher than they really are, it muſt bring them nearer the point of the verticals, where they come nearer together.

REFRACTION *of altitude* is an arch of a vertical circle, whereby the altitude is increaſed by the refraction.

REFRACTION *of declination* is an arch of a circle of declination, whereby the declination of the object is either increaſed or diminiſhed by the refraction.

REFRACTION *of longitude* is an arch of the ecliptic, whereby the longitude of the object is increaſed or diminiſhed by the refraction.

REFRACTION *of latitude*, is an arch of a circle of latitude, whereby the latitude of a heavenly object is either increaſed or diminiſhed by its refraction.

REFRACTION *in iſland cryſtal*. There is a double refraction in this ſubſtance, contrary ways, whereby not only oblique rays are divided into two, and refracted into oppoſite parts, but even perpendicular rays, and one half refracted.

Cauſtic by REFRACTION. See the article DIACAUSTIC.

REFRANGIBILITY *of light*, the diſpoſition of rays to be refracted. See REFRACTION, LIGHT, and RAY.

REFRIGERATIVE, in medicine, a remedy which refreſhes the inward parts, by cooling them, as clyſters, ptiſans, &c.

REFRIGERATORY, in chemiſtry, a veſſel filled with cold water, through which the worm paſſes in diſtillations; the uſe of which is, to condenſe the vapours as they paſs through the worm.

REFUGE, a ſanctuary or aſylum. See article ASYLUM.

REFUGEES, french proteſtants, who by the revocation of the edict of Nantz, have been conſtrained to fly from perſecution and take refuge in foreign countries.

REGAL, or ROYAL, ſomething belonging to a king. See ROYAL.

REGALE, a magnificent entertainment, or treat, given to embaſſadors, and other perſons of diſtinction, to entertain or do them honour.

It is uſual, in Italy, at the arrival of a traveller of eminence, to ſend him a regale, that is, a preſent of ſweetmeats, fruit, &c. by way of refreſhment.

REGALE, in the french juriſprudence, is a royal prerogative, which conſiſts in enjoying the revenues of biſhoprics during the vacancy of their ſees, of preſenting to benefices, and of obliging the new biſhop to take an oath of fidelity, and to regiſter it in the chamber of accounts. The enjoyment of the fruits of the ſee is called the temporal regale; and that of preſenting to the ſee, the ſpiritual regale.

REGALIA, in law, the rights and prerogatives of a king; which, according to civilians are ſix: *viz.* 1. the power of judicature: 2. the power of life and death: 3. the power of peace and war: 4. a right to ſuch goods as have no owner, as waifs, eſtrays, &c. 5. aſſeſſments; and 6. the coinage of money.

Regalia is alſo uſed for the apparatus of a coronation, as the crown, the ſceptre with the croſs, that with the dove, St. Edward's ſtaff, the globe, and the orb with the croſs, four ſeveral ſwords, &c.

REGALIA *of the church* are the rights and privileges which cathedrals, &c. enjoy by the grants of kings; and this term is particularly uſed for ſuch lands and hereditaments as have been given by kings to the church.

Regalia is alſo ſometimes uſed for the patrimony of the church.

REGARD *of the foreſt*, the inſpection or overſight thereof, or the office and province of the regarder. See REGARDER.

REGARDANT, in heraldry, ſignifies looking behind, and is uſed for a lion, or other beaſt, with his face turned towards his tail.

Villain REGARDANT, or REGARDANT *to the manor*, ſignifies a ſervant or retainer to the lord, who was thus called from his doing all the baſe ſervices within the manor, and being charged to ſee that it was freed from every thing filthy and loathſome.

REGARDER, an antient officer of the king's foreſt, ſworn to make the regard of the foreſt every year; that is, to take a view of its limits, to enquire into all offences and defaults committed by the foreſters within the foreſt, and to obſerve whether all the other officers executed their reſpective duties.

REGEL, or RIGEL, a fixed ſtar of the firſt magnitude, in orion's left foot, whoſe longitude is 72° 10′, and latitude 30° 10′. See ORION.

REGEN, a river of Germany, which riſes in the mountains that divide Bohemia from Bavaria, and falls into the Danube at Ratiſbon.

REGENERATION, in theology, the act of being born again by a ſpiritual birth, or the change of heart and life, experienced by a perſon who forſakes a courſe of vice, and ſincerely embraces a life of virtue and piety.

REGENT, one who governs a kingdom during the minority or abſence of the king. In France, the queen-mother has the regency of the kingdom during the minority of the king, under the title of queen-regent.

REGENT alſo ſignifies a profeſſor of arts and ſciences in a college, who has a ſet of pupils under his care; but here regent is generally reſtrained to the lower claſſes, as regent of rhetoric, regent of logic, &c. thoſe of philoſophy are rather called profeſſors. The foreign univerſities are generally compoſed of doctors, profeſſors, and regents.

REGICIDE, KING-KILLER, a word chiefly uſed with us in ſpeaking of the perſons concerned in the trial, condemnation and execution of king Charles I.

REGIFUGE, a feaſt celebrated in antient Rome on the ſixth of the calends of March, in memory of the expulſion of their antient kings, and particularly of Tarquin's flying out of Rome on that day.

REGIMEN, the regulation of diet, and in a more general ſenſe, of all the non-naturals, with a view to preſerve or reſtore health.

Dr. Mead obſerves, with reſpect to regimen, that diſeaſes from inanition are generally more dangerous than thoſe which proceed from repletion, becauſe we can more expeditiouſly diminiſh than increaſe the juices of the body. Upon this account, though temperance is beneficial to all men, the antient phyſicians adviſed perſons in good health to indulge a little now and then, by eating and drinking more plentifully than uſual: but of the two, intemperance in drinking is ſafer than in eating; and if a perſon has committed exceſs in the latter, cold water drank upon a full ſtomach will help digeſtion; to which it will be of ſervice to add lemon-juice or elixir of vitriol,

vitriol, if he has eaten high ſeaſoned things, rich ſauces, &c. Then let him ſit up for ſome time, and afterwards ſleep. But if a man happens to be obliged to faſt, he ought to avoid all laborious work. From ſatiety it is not proper to paſs directly to ſharp hunger, nor from hunger to ſatiety; neither will it be ſafe to indulge abſolute reſt immediately after exceſſive labour, nor ſuddenly to fall to hard work after long idleneſs. In a word, all changes in the way of living ſhould be made by degrees. It is alſo beneficial to vary the ſcenes of life, to be ſometimes in the country, ſometimes in town; to go to ſea, to hunt, to be at reſt now and then, but more frequently to uſe exerciſe, and a moderate ſleep. See EXERCISE and SLEEP.

The ſofter and milder kinds of aliment are proper for children, and for youths the ſtronger. Old people ought to leſſen the quantity of their food, and increaſe that of their drink. But yet ſome allowance is to be made for cuſtom, eſpecially in the colder climates, like ours; for as in theſe the appetite is keener, ſo is the digeſtion is better performed.

In the ſummer, ſays Dr. Brookes, when the ſpirits and fluid parts are apt to evaporate, the aliment ſhould be light, moiſt, fluid, and eaſy of digeſtion, to repair the loſs with the greater ſpeed: and as digeſtion depends in part on the due preparation of the aliments, it is neceſſary to chew them well, eſpecially if they are hard, that they may be the more intimately mixed with the ſaliva; for thoſe who eat in a hurry, without much chewing, are very ſubject to indigeſtions. For the qualities of different kinds of food, ſee DIET, DIGESTION, FLESH, FRUIT, &c.

It is well known, that cold ſtops the pores, and diminiſhes perſpiration. To ſhun this inconvenience, it will be neceſſary to put on winter garments pretty early, and to leave them off late, and not to paſs too ſuddenly from a hot into a cold air, and to avoid drinking any thing cold, when the body is hot, or when a perſon has been for ſome time ſpeaking in public.

In ſhort, the paſſions and affections of the mind produce very ſenſible effects. Joy, anger, fear, and ſorrow, are the principal. In the firſt, the ſpirits are hurried with too great vivacity; in fear or dread, they are as it were, curbed and concentrated; and continual ſorrow and anguiſh of mind render the fluids of the body thick, and the blood unapt for a due circulation, whence proceed many chronic diſeaſes: it is therefore, on all accounts, as much our intereſt as our duty, to keep the paſſions within due bounds, and to preſerve an inward ſerenity, calmneſs and tranquility.

REGIMEN, in chemiſtry, ſignifies the due regulation of fire. See FIRE.

REGIMEN, in grammar, that part of ſyntax, or conſtruction, which regulates the dependency of words, and the alterations which one occaſions in another.

Regimen is threefold, of nouns, of verbs, and of indeclinable words. See NOUN, VERB, and INDECLINABLE.

The regimen of latin-ſubſtantive nouns is moſtly of the genitive caſe, but that of adjectives, is of the genitive, dative, accuſative and ablative.

The regimen of verbs may be diſtributed into three claſſes, the firſt of which is the regimen of verbs perſonal; the ſecond is that of verbs imperſonal; and the third that of the infinitives, participles, gerunds and ſupines. See the articles VERB, PARTICIPLE, &c.

The regimen of indeclinable words is that of the adverbs, prepoſitions, interjections and conjunctions. See the articles ADVERB, PREPOSITION, &c.

In general, the regimen, or conſtitution of government, is almoſt intirely arbitrary, and varies greatly in all languages. For one language forms its regimen by caſes, as the latin and greek. Others, inſtead of caſes, make uſe only of ſmall particles, as the engliſh, *by*, *of*, *to*, &c. The french, ſpaniſh, and italian by *de*, *a*, *da*, &c. There are, however, ſome few maxims which hold good in every language, as, 1. That there is no nominative caſe in any ſentence but has a reference to ſome verb either expreſſed or underſtood. 2. That there is no verb which has not its nominative caſe expreſſed or underſtood, though in the latin before an infinitive, there is an accuſative. 3. That there is no adjective but has a relation to ſome ſubſtantive. 4. That there is no genitive caſe but is governed by ſome other noun. This rule does not ſo apparently hold in the modern, as in the antient languages, in regard the particles *of*, *de*, &c. which are the proper ſigns of the genitive caſe, are frequently uſed as prepoſitions. 5. That the regimen of verbs is frequently laid upon different kinds of relations, according to cuſtom or uſage,

which yet does not change the ſpecific relation of each caſe, but only ſhews that cuſtom has made choice of this or that according to fancy.

Sometimes theſe different governments have a power of changing the ſenſe according to the different cuſtom of languages, in which caſe the particular uſe of languages muſt be always conſulted.

There is one very common fault committed in regimen, which ſhould be carefully avoided by accurate writers, *viz.* the uſing two verbs that require different caſes together, as only governing one caſe, as in this example, "after em- "bracing and giving his bleſſing to his "ſon," where, "embracing," requires an accuſative caſe, and "giving," a dative. The ſame is to be obſerved in the regimen of nouns.

REGIMENT, in war, is a body of men, either horſe or foot, commanded by a colonel.

Each regiment of foot is divided into companies, but the number of companies is not always alike, though our regiments generally conſiſt of thirteen companies, one of which is always grenadiers.

Regiments of horſe moſt commonly conſiſt of ſix troops, but ſome have nine.

Regiments of dragoons, in time of war, are generally compoſed of eight troops, and in time of peace, of ſix. Each regiment has a chaplain and a ſurgeon. See TROOP and COMPANY.

Some german regiments conſiſt of two thouſand foot, and the regiment of Picardy in France, conſiſts of 120 companies, or 6000 men.

REGIO ASSENSU, a writ by which the king gives his royal aſſent to the election of a biſhop.

REGION, in geography, a large extent of land, inhabited by many people of the ſame nation, and incloſed within certain limits or bounds.

The modern aſtronomers divide the moon into ſeveral regions, or large tracts of land, to each of which they give its proper name.

REGION, in phyſiology, is taken for a diviſion of our atmoſphere, which is divided into the upper, middle, and lower regions. See ATMOSPHERE.

The upper region commences from the tops of the mountains, and reaches to the utmoſt limits of the atmoſphere. In this region reigns a perpetual, equable, calmneſs, clearneſs and ſerenity. The middle region is that in which the clouds reſide, and where meteors are formed, extending from the extremity of the loweſt to the tops of the higheſt mountains. The loweſt region is that in which we breathe, which is bounded by the reflection of the ſun's rays; or by the height to which they rebound from the earth. See ATMOSPHERE and AIR.

Æthereal REGION, in coſmography, is the whole extent of the univerſe, in which is included all the heavenly bodies, and even the orb of the fixed ſtars. See the article ÆTHER.

Elementary REGION, according to the Ariſtotelians, is a ſphere terminated by the concavity of the moon's orb, comprehending the atmoſphere of the earth.

REGION, in anatomy, a diviſion of the human body, otherwiſe called cavity, of which anatomiſts reckon three, *viz.* the upper region, or that of the head; the middle region, that of the thorax or breaſt; and the lower, the abdomen, or belly. See the articles HEAD, THORAX, and ABDOMEN.

REGISTER, a public book, in which is entered and recorded memoirs, acts and minutes, to be had recourſe to occaſionally, for knowing, and proving matters of fact.

Of theſe there are ſeveral kinds; as, 1. Regiſters of deeds in Yorkſhire and Middleſex, in which are regiſtered all deeds, conveyances, wills, *&c.* that affect any lands or tenements in thoſe counties, which are otherwiſe void againſt any ſubſequent purchaſers, or mortgagees, *&c.* but this does not extend to any copyhold eſtate, nor to leaſes at a rack-rent, or where they do not exceed twenty-one years. The regiſtred memorials muſt be ingroſſed on parchment, under the hand and ſeal of ſome of the grantors or grantees, atteſted by witneſſes who are to prove the ſigning or ſealing of them, and the execution of the deed.

But theſe regiſters which are confined to two counties, are in Scotland general, by which the laws of North Britain are rendered very eaſy and regular. Of theſe there are two kinds; the one general, fixed at Edinburgh, under the direction of the lord-regiſter; and the other is kept in the ſeveral ſhires, ſtewarties, and regalities, the clerks of which are obliged to tranſmit the regiſters of their reſpective courts to the general regiſter. No man in Scotland, can have a right to any

any eſtate, but it muſt become regiſtred within forty days of his becoming ſeiſed thereof; by which means all ſecret conveyances are cut off. 2. Pariſh regiſters, are books in which are regiſtered the baptiſms, marriages, and burials of each pariſh.

REGISTER, is alſo uſed for the clerk or keeper of a regiſter.

Of theſe we have ſeveral, denominated from the regiſters they keep; as regiſter of the high court of delegates; regiſter of the arches court of Canterbury; regiſter of the court of admiralty; regiſter of the prerogative court; regiſter of the garter, *&c.*

REGISTER SHIPS, in commerce, are veſſels which obtain a permiſſion either from the king of Spain, or the council of the Indies, to traffic in the ports of the Spaniſh Weſt-Indies; which are thus called, from their being regiſtred before they ſet ſail from Cadiz, for Buenos Ayres. Each of theſe permiſſions coſt 30,000 pieces of eight, and by the tenor of the cedula, or permit, they are not to exceed 300 tuns; but there is ſuch a good underſtanding between the merchants, and the council of the Indies, that ſhips of 5 or 600 tuns frequently paſs unnoted; and though the quantity and quality of the merchandizes on board are always expreſſed, yet, by means of preſents, the officers both in Spain and the Indies, allow them to load and unload, vaſtly more than the permiſſion expreſſes.

REGISTER, in printing, is diſpoſing the forms on the preſs, ſo as that the lines and pages printed on one ſide of the ſheet, fall exactly on thoſe of the other.

REGISTER, among letter-founders, is one of the inner parts of the mould, in which the printing types are caſt. See the article *Letter* FOUNDERY.

Its uſe is to direct the joining the mould juſtly together again, after opening it to take out the new caſt letter.

REGISTERS, in chemiſtry, are holes, or chinks with ſtopples, contrived in the ſides of furnaces, to regulate the fire; that is, to make the heat more intenſe, or remiſs, by opening them to let in the air, or keeping them cloſe to exclude it. There are alſo regiſters in the ſteam-engine. See ENGINE.

REGISTRY, the office, books, and rolls, in which the proceedings in chancery, or any ſpiritual court, are regiſtred.

REGIUS *profeſſor*. See PROFESSOR.

REGLET, or RIGLET, in architecture, a flat narrow moulding, uſed chiefly in pannels and compartiments, to ſeparate the parts or members from one another, and to form knots, frets, and other ornaments.

REGLETS, or RIGLETS, in printing, are thin ſlips of wood, exactly plained to the ſize of the body of the letter.

The ſmaller ſorts are placed between the lines of poetry, and both thoſe and the larger are uſed in filling up ſhort pages, in forming the whites or diſtances between the lines of titles, and in adjuſting the diſtances of the pages in the chaſe, ſo as to form regiſter. See the articles REGISTER and PRINTING.

REGRATOR, or REGRATER, in law, formerly ſignified one who bought wholeſale, or by the great, and ſold again by retail: but the term is now uſed for one who buys any wares or victuals, and ſells them again in the ſame market, or fair, or within five miles round it. See the article FORESTALLING.

REGRATOR, is alſo uſed for one who furbiſhes up old moveables to make them paſs for new. And maſons, who take off the outward ſurface of hewn ſtone, in order to whiten it, or make it look freſh again, are ſaid to regrate.

REGULAR, denotes any thing that is agreeable to the rules of art: thus, we ſay a regular building, verb, *&c.* See BUILDING, VERB, *&c.*

A regular figure, in geometry, is one whoſe ſides, and conſequently angles, are equal; and a regular figure with three or four ſides, is commonly termed an equilateral triangle, or ſquare, as all others with more ſides are called regular polygons. See the articles TRIANGLE, SQUARE, and POLYGON.

All regular figures may be inſcribed in a circle. See the articles CIRCLE, PENTAGON, HEXAGON, *&c.*

A regular ſolid, called alſo a platonic body, is that terminated on all ſides by regular and equal planes, and whoſe ſolid angles are all equal. See SOLID.

The regular bodies are the five following: 1. The tetrahedron, which is a pyramid, comprehended under four equal and equilateral triangles. 2. The hexahedron, or cube, whoſe ſurface is compoſed of ſix equal ſquares. 3. The octahedron, which is bounded by eight equal and equilateral triangles. 4. The dodecahedron, which is contained under twelve equal and equilateral pentagons.

5. The

5. The icoſihedron, conſiſting of twenty equal and equilateral triangles. Theſe five are all the regular bodies in nature. See TETRAHEDRON, *&c.*

The proportion of the five regular bodies inſcribed in the ſame circle from Peter Horigon. Curſus Math. vol. i. p. 779. and Barrow's Euclid, lib. xiii.

The diameter of the ſphere being 2.

The circumference of the greateſt circle is — —	6.28318
Superficies of the greateſt circle	3.14159
Superficies of the ſphere	12.56637
Solidity of the ſphere	4.18859
Side of the tetrahedron	1.62299
Superficies of a tetrahedron	4.6188
Solidity of a tetrahedron	0.15132
Side of a cube or hexahedron	1.1547
Superficies of the hexahedron	8.
Solidity of the hexahedron	1.5396
Side of an octahedron	1.41421
Superficies of the octahedron	6.9282
Solidity of the octahedron	1.33333
Side of the dodecahedron	0.71364
Superficies of the dodecahedron	10.51462
Solidity of the dodecahedron	2.78516
Side of the icoſihedron	1.05146
Superficies of the icoſihedron	9.57454
Solidity of the icoſihedron	2.53615

If one of theſe five regular bodies were required to be cut out of the ſphere of any other diameter, it will be as the diameter of the ſphere 2 is to the ſide of any one ſolid inſcribed in the ſame (ſuppoſe the cube 1.1547) ſo is the diameter of any one ſphere (ſuppoſe 8) to 9.2376, the ſide of the cube inſcribed in this latter ſphere.

Let *dr* (plate CCXXXI. fig. 2.) be the diameter of any ſphere, and *da* $\frac{1}{3}$ of it $=$ *ab* $=$ *br*. Erect the perpendiculars *ae*, *cf*, and *bg*, and draw *de*, *df*, *er*, *fr*, and *gr*. Then will

1. *re* be as the ſide of the tetrahedron.
2. *df* is the ſide of the hexahedron.
3. *de* is the ſide of the octahedron.
4. Cut *de* in extreme and mean propoſition in *h*, and *dh* will be the ſide of the dodecahedron.
5. Set the diameter *dr* up, perpendicularly, at *r*, and from the center *c*, to its top, draw the line *cg*, cutting the circle in *g*. Let fall the perpendicular *gb*; then is *br* the ſide of the icoſihedron.

REGULAR *curves*, ſuch as proceed gradually in the ſame geometrical manner, with regard to their curvities. See the article CURVE.

REGULAR, in a monaſtery, a perſon who has taken the vows; becauſe he is bound to obſerve the rules of the order he has embraced. See MONK.

REGULAR *prieſt*, a prieſt in ſome religious order; in contradiſtinction to a ſecular prieſt, or one that lives in the world at large. See PRIEST.

REGULAR *places*, thoſe contained within the boundary or incloſure of the convent. See the article CONVENT.

REGULATION, a rule or order preſcribed by a ſuperior, for the proper management of ſome affair.

REGULATOR *of a watch*, the ſmall ſpring belonging to the ballance; ſerving to adjuſt its motions, and make it go faſter or ſlower. See WATCH.

REGULUS, in ornithology, the name of ſeveral birds of the motacilla-kind, as,

1. The creſted regulus, about the ſize of the common wren; the head, neck, and back of which are of a mixed colour of greeniſh and grey, its breaſt and belly of a pale grey, and its wings variegated with black and yellow; the head in the male is ornamented with an orange-coloured creſt or crown; whence the names regulus, tyrannus, *&c.* 2. The yellow waſted, greyiſh green regulus, without a creſt: this is a very elegant little bird, about the ſize of the former ſpecies; the ſides of its head are ornamented with an oblong yellow line, running from the eyes to the hinder part of the head. See plate CCXXXI. fig. 3.

REGULUS, in chemiſtry, an imperfect metallic ſubſtance, that falls to the bottom of the crucible, in the melting of ores, or impure metallic ſubſtances.

This operation almoſt always requires the addition of ſuch ingredients as take away the mutual connection between the parts to be ſeparated; that is, the menſtrual virtue, by means of which one keeps the other in a ſtate of diſſolution. For inſtance, the reguline part of antimony, and mineral ſulphur, mutually diſſolve each other, and conſtitute crude antimony; nor can they be ſeparated by fire alone without deſtroying the regulus: but if you add iron, copper, ſilver, *&c.* which are more thoroughly penetrated by ſulphur, then the regulus of antimony is freed of the ſulphur, and being heavier than the additional bodies then joined to it, ſinks to the bottom. See FLUX.

Regulus of antimony is of three kinds, *viz.* the regulus of antimony, ſimply ſo called, martial regulus of antimony, and ſtellated regulus of antimony. 1.

The

The firſt is prepared as follows: Take antimony, nitre, and crude tartar, of each equal parts; grind them ſeparately into a powder, then mix, and rub them all together; after which, throw the powder by degrees into a red hot crucible, taking care to break the cruſt, which forms on the ſurface, with an iron rod; when the detonation is over, let a ſtrong fire be made, that the matter may flow like water, then pour it out into a warm greaſed cone, which is to be gently ſtruck on the ſides, that the regulus may ſeparate and fall to the bottom; when grown cold, let the regulus be cleaned from the ſcoriæ that lie a-top of it. 2. Martial regulus of antimony is thus made: Take antimony and nitre of each a pound; and crude tartar half a pound; and ſmall pieces of iron, half a pound: heat the iron in a crucible to a white heat: then gradually add the other ingredients, firſt powdered and mixed together, and proceed in the ſame manner as in the foregoing proceſs. 3. Stellated regulus of antimony is made by melting the martial regulus ſeveral times with freſh nitre and tartar.

The foregoing reguli are at preſent rarely, if ever, made uſe of in medicine: the emetic cups, and perpetual pills, formerly made from them, have long been laid aſide, as precarious and unſafe; but the ſcoriæ produced in theſe ſeveral proceſſes, afford medicines leſs violent, ſome of which are in conſiderable eſteem. However, they are of uſe in ſeveral mechanic arts, and particularly in mixing with tin, in making pewter. See the article PEWTER.

REGULUS, in aſtronomy, a ſtar of the firſt magnitude, in the conſtellation leo, called alſo from its ſituation, *cor leonis*, or, the lion's heart.

Its longitude, according to Mr. Flamſtead, is 25° 31′ 20″, and its latitude 0° 26′ 38″ north.

REHABILITATION, in the civil and canon law, the reſtoring a delinquent to his former condition.

REHEARSAL, in muſic, and the drama, an eſſay or experiment of ſome compoſition generally made in private, previous to its repreſentation or performance in public, in order to render the actors and performers more perfect in their parts.

REIMBURSEMENT, in commerce, the act of repaying another the expences he has been at on our account.

REIN-DEER, in zoology, a ſpecies of the cervus, with horns ramoſe and cylindric, with their tops palmated. See the article CERVUS.

This is a large and beautiful ſpecies, not inferior to the elk in ſize or ſtrength, but greatly exceeding it in form; it is of the ſize of a ſmall horſe, but its ſhape is exactly that of the red-deer. It is a native of the northern regions, there being no country ſo far north as not to afford it, where it is of vaſt uſe to the inhabitants, as a beaſt of draught.

REINFORCED, or RENFORCED RING, of a cannon, is the next after the trunnions, betwixt them and the touch-hole.

REINFORCEMENT, in war, a freſh ſupply of men, arms, ammunition, &c.

REINTEGRATION. See the article REDINTEGRATION.

REINS, in anatomy, the ſame with kidneys. See KIDNEYS.

REINS *of a bridle*, are two long ſlips of leather, faſtened on each ſide of a curb or ſnaffle, which the rider holds in his hand, to keep his horſe in ſubjection.

There is alſo what is called falſe reins, which is a lath of leather, paſſed ſometimes through the arch of the banquet, to bend the horſe's neck.

REINSTATING, reſtoring a perſon or thing, to its former ſtate or condition.

REJOINTING, in architecture, filling up the joints of the ſtones in buildings. This ought to be performed with the beſt mortar, as that of lime and cement, and ſometimes with plaſter, as in the joints of vaults.

REJOYNDER, or REJOINDER, in law, is the defendant's anſwer to the plaintiff's replication or reply. Thus, in the court of chancery, the defendant puts in an anſwer to the plaintiff's bill, which is ſometimes alſo called an exception; the plaintiff's anſwer to this is called a replication, and the defendant's anſwer to that a rejoynder.

REIS, RE, or RES. See REE.

REITERATION, the act of repeating a thing, or doing it a ſecond time.

RELAPSE, a falling again into a danger, evil, or diſeaſe, from which a perſon has eſcaped.

RELATION, *relatio*, in philoſophy, the mutual reſpect of two things, or what each is with regard to the other.

The idea of relation is acquired, by comparing one thing with another; and the denominations given to the reſpect, which they bear to each other, are termed

ed relatives, and the things themſelves related.

Relations make the largeſt claſs of our perceptions, ſince every ſingle object admits of almoſt innumerable compariſons with others: thus, if we compare one thing with another in reſpect of bulk, we get the ideas of greater, leſs, or equality; if in reſpect of time, of older and younger; and ſo for other relations, which we can purſue at pleaſure, almoſt without end; whence it is eaſy to conceive, how very extenſive this tribe of our perceptions muſt be. However, here, as well as in the other kinds of our complex ideas, we bound ourſelves for the moſt part to ſuch compariſons, as the exigencies of ſociety, the wants of life, and the different profeſſions of men render neceſſary; and are more or leſs accurate in tracing out the relations of things, according to the degree of importance they appear to have in theſe reſpects. The relations of men one to another, ariſing either from the ties of blood, their ſeveral ranks and places in the community, or a mutual intercourſe of good offices, being of great weight and concern in the commerce of life, have in a particular manner engaged our attention, and are therefore very minutely deſcribed. For the ſame reaſon men have found it neceſſary, to determine as exactly as poſſible, the various dependence of things, as their happineſs is nearly connected with this knowledge. When we conſider objects merely in reſpect of exiſtence, as either giving or receiving it, we come by the relative ideas of cauſe and effect, which are very nearly connected with the welfare of mankind; it being evident, that the ſeveral ſchemes and purpoſes of life are all conducted upon a previous ſuppoſition, that certain known cauſes will have their uſual regular effects, and ſuch and ſuch actions be attended with ſuch and ſuch conſequences. See the articles CAUSE, EFFECT, and EXPERIMENTAL PHILOSOPHY.

But there are other relations of this kind, as when we alſo take in the additional gifts of a capacity for happineſs, and the means of attaining it; which conſtitutes the relation of creator and creature, in the more ſolemn acceptation of theſe words. Again, when we conſider the great author of our being, not only as the creator of the univerſe, but alſo as preſerving and holding it together, and preſiding over the preſent frame of things with uncontrouled dominion; he then appears under the notion of a moral governor, to whom we are accountable for our actions, and the uſe we make of thoſe powers and faculties we derive from him. And thus we may, in ſome meaſure, perceive, how the mind proceeds in comparing its ideas together, and by what views it is chiefly governed in framing the compound notions of this claſs, by which it repreſents the various habitudes of things.

We ſhall only add two more obſervations upon this ſubject: 1. That our ideas of relations are, for the moſt part, very clear and diſtinct; for the comparing of things together being a voluntary act of the mind, we cannot but ſuppoſe it muſt be acquainted with its own views in the compariſon; and, of courſe, have a clear conception of the foundation of that relation; and what is ſtill more remarkable of the ideas of this claſs, they ceaſe not to be diſtinct, even the ſubjects compared are but imperfectly known; for though we cannot comprehend the manner of the world's being created, yet we find no difficulty in framing the ideas the relative words creator and creature ſtand for. 2. Our ideas of relations are among the moſt important conceptions of the underſtanding, and afford the largeſt field for the exerciſe and improvement of human knowledge. See the article KNOWLEDGE.

Moral actions are nothing but relations, it being their conformity or diſagreement with ſome rule that makes them either good or bad, or indifferent; and indeed, we ought carefully to diſtinguiſh between the poſitive idea or the action, and the reference it has to a rule. Thus, the taking from another what is his, without his conſent, is properly called ſtealing; but that name being commonly underſtood to ſignify alſo the moral pravity of the action, men are apt to condemn whatever they hear called ſtealing as an ill action, diſagreeing with the rule of right: and yet the private taking away his ſword from a madman, to prevent his doing miſchief, though it be properly denominated ſtealing, is nevertheleſs agreeable to the law of God. See the articles ETHICS and MORALITY.

It would be infinite to go over all ſorts of relations; we have therefore contented ourſelves with mentioning ſome of the moſt conſiderable, and ſuch as may ſerve

to let us ſee from whence we get our ideas of relations, and wherein they are founded.

RELATION, among the antient logicians, conſtituted one of the ten categories, or predicaments. See CATEGORY.

RELATION, in geometry, ſignifies the ſame with ratio. See RATIO.

RELATION, in grammar, is the correſpondence which words have to one another in conſtruction.

RELATION is alſo uſed for analogy. See the article ANALOGY.

RELATION, in law, is where two times, or other things, are conſidered as if they were one and the ſame; and by this the thing ſubſequent is ſaid to take its effect, by relation, from the time preceding: thus, in caſe of a deed of bargain and ſale inrolled, the inrollment ſhall have relation to the delivery thereof; and in our courts, a judgment has always relation to the firſt day of term.

RELATIVE, ſomething relating to, or reſpecting, another. See the preceding article.

RELATIVE TERMS, in logic, are words which imply a relation: ſuch are maſter and ſervant, huſband and wife, &c.

In grammar, relative words are thoſe which anſwer to ſome other word foregoing, called the antecedent: ſuch are the relative pronouns, *qui, quæ, quod*, &c. and in engliſh, *who, whom, which*, &c. The word anſwering to theſe relatives is often underſtood as, *I know whom you mean*, for, *I know the perſon whom you mean*.

RELAXATION, in medicine, &c. the the act of looſening or ſlackening, or the looſeneſs and ſlackneſs of the fibres, nerves, muſcles, &c.

RELAXATION, in law, is the ſame with releaſing. See the article RELEASE.

RELAY, a ſupply of horſes placed on the road, and appointed to be ready for a traveller to change, in order to make the greater expedition.

In hunting, relay ſignifies freſh ſets of dogs, or horſes, or both, placed in readineſs, in caſe the game comes that way, to be caſt off, or to mount the hunters, in lieu of the former, which are ſuppoſed to want reſpite.

RELAY, in tapeſtry, is an opening left, where the colours and figures are to be changed, when the piece is finiſhed.

RELEASE, in law, is an inſtrument in writing, by which eſtates, rights, titles, entries, actions, and other things, are extinguiſhed and diſcharged; and ſometimes transferred, abridged, or enlarged: and, in general, it ſignifies one perſon's giving up or diſcharging the right or action he has, or claims to have, againſt another, or his lands, &c.

A releaſe may be either in fact or in law; a releaſe in fact is where it is expreſly declared, by the very words, as the act and deed of the party; and a releaſe in law is that which acquits by way of conſequence, as where a feme creditor takes the debtor to huſband.

The perſon releaſing is termed the releaſor, and he to whom the releaſe is made, the releaſee.

RELEGATION, a kind of baniſhment or exile, in which a perſon is ſentenced to retire to a certain place preſcribed, and to continue there a certain time, or till he is recalled.

In Rome, relegation was a leſs ſevere puniſhment than deportation, ſince he who was relegated, neither loſt the rights of a roman citizen, nor thoſe of his family, as the authority of a father over his children, &c.

RELICS, in the romiſh church, the remains of the bodies or cloaths of ſaints or martyrs, and the inſtruments by which they were put to death, devoutly preſerved, in honour to their memory; kiſſed, revered, and carried in proceſſion.

This is a piece of ſuperſtition which began very early in the chriſtian church, and at preſent makes no inconſiderable article of popery. The ſhrines in which they are depoſited are firſt ſprinkled with holy water and ſolemnly bleſſed. The ſubſtance of the prayer on this occaſion is, that God would grant his protection to ſuch as revere the merits of his ſaints, and humbly embrace their relics; to the end that theſe faithful ſupplicants may be guarded from the power of the devil, from thunder, plague, bad air, wild beaſts, and from the hoſtilities and machinations of men.

The catacombs are an inexhauſtible fund of relics; yet it is ſtill diſputed who were the perſons interred in them. See the article CATACOMB.

The tranſlation of relics, or depoſiting them in ſome church, is performed with great care and ceremony. Before they are tranſlated, they are examined by the biſhop, who pronounces a ſolemn benediction over them. On the day of their tranſlation, the houſes in the ſtreets thro' which they paſs, are covered with tapeſ-

try: the church and altar are pompously adorned, and the images of the saints ranged in open view. The relics are carried in procession under a canopy, the clergy walking before, and the people surrounding them with lighted tapers in their hands. As soon as they enter the church, Te Deum is sung, and the relics are set upon the altar. Prayers are appointed in honour of them, and a lamp is left burning day and night before the place where they are afterwards deposited.

RELICT, in law, the same with widow. See the article WIDOW.

RELIEF, in law, a certain sum of money which every freehold-tenant, being at age, formerly paid, and in some places still pays, to his lord, on his entrance upon the inheritance of his ancestor's lands, &c. by the payment of which money the heir is said to relieve, or raise again the lands, after they were fallen into the superior's hands.

A person may hold lands of another, by rent, and a customary relief, which is only payable by freeholders; and for which the lord may distrain, but cannot bring an action of debt, though his executors may. These reliefs are, in some places, half a year, or a year's rent, and the profits of the lands; and in others, double the same for that year.

RELIEF, in chancery, is an order sued out, for dissolving contracts and other acts, on account of their being unreasonable, prejudicial, or grievous; or from some other nullity, either de jure, or de facto.

RELIEF *of a hare*, among hunters, is the place where she goes to feed in an evening.

RELIEF, in sculpture. See RELIEVO.

RELIEVE, in a military sense, is to send off those men that are upon duty, and to bring others to take their place: thus, to relieve the guard, the trenches, &c. is to bring fresh men upon duty, and to discharge those who were upon duty before.

RELIEVO, or RELIEF, in sculpture, &c. is the projecture or standing out of a figure, which arises prominent from the ground or plan on which it is formed; whether that figure be cut with the chissel, moulded, or cast.

There are three kinds or degrees of relievo, *viz.* alto, basso, and demi-relievo. The alto-relievo, called also haut-relief, or high-relievo, is when the figure is formed after nature, and projects as much as the life. Basso-relievo, bass-relief, or low-relievo, is when the work is raised but a little from the ground, as in medals, and the frontispieces of buildings; and particularly in the histories, festoons, foliages, and other ornaments of friezes. Demi-relievo is when one half of the figure rises from the plan. When, in a basso-relievo, there are parts that stand clear out, detached from the rest, the work is called a demi-basso.

In architecture, the relievo of projecture of the ornaments, ought always to be proportioned to the magnitude of the building it adorns, and to the distance at which it is to be viewed.

RELIEVO, or RELIEF, in painting, is the degree of boldness with which the figures seem, at a due distance, to stand out from the ground of the painting.

The relievo depends much upon the depth of the shadow, and the strength of the light; or on the height of the different colours, bordering on one another; and particularly on the difference of the colour of the figure from that of the ground: thus, when the light is so disposed as to make the nearest parts of the figure advance, and is well diffused on the masses, yet insensibly diminishing, and terminating in a large spacious shadow, brought off insensibly, the relievo is said to be bold, and the clair obscure well understood.

RELIGION, that worship and homage which is due to God, considered as our creator, preserver, and most bountiful benefactor.

As our affections depend on our opinions of their objects, it seems to be among the first duties we owe to the author of our being, to form the least imperfect, since we cannot form perfect, conceptions of his character and administration: for such conceptions will render our religion rational, and our dispositions refined. If our opinions are diminutive and distorted, our religion will be superstitious, and our temper abject. Thus, if we ascribe to the Deity that false majesty, which consists in the unbenevolent and sullen exercise of mere will or power, or suppose him to delight in the prostrations of servile fear, or as servile praise, he will be worshiped with mean adulation, and a profusion of compliments. If he be looked upon as a stern and implacable being, delighting in vengeance, he will be adored with pompous offerings, or whatever else may be thought proper to sooth and mollify him. But if we believe per-

fect goodneſs to be the character of the ſupreme Being, and that he loves thoſe who reſemble him moſt, in this, the moſt amiable of his attributes, the worſhip paid him will be rational and ſublime, and his worſhipers will ſeek to pleaſe him by imitating that goodneſs which they adore. Indeed, wherever right conceptions of the Deity, and his providence, prevail, when he is conſidered as the inexhauſted ſource of light, and love, and joy, as acting in the joint character of a father and governor, what veneration and gratitude muſt ſuch conceptions, thoroughly believed, excite in the mind? how natural and delightful muſt it be, to one whoſe heart is open to the perception of truth, and of every thing fair, great, and wonderful in nature, to engage in the exerciſes of religion, and to contemplate and adore him, who is the firſt fair, firſt great, and firſt wonderful; in whom wiſdom, power, and goodneſs dwell vitally, eſſentially, and act in perfect concert? what grandeur is here, to fill the moſt enlarged capacity, what beauty to engage the moſt ardent love, what a maſs of wonders, in ſuch exuberance of perfection, to aſtoniſh and delight the human mind, through an unfailing duration! When we conſider the unſullied purity, and abſolute perfection of the divine nature; and reflect on the imperfection and various blemiſhes of our own, and the ungrateful returns we have made to his goodneſs, we muſt ſink, or be convinced we ought to ſink, into the deepeſt humility and proſtration of ſoul before him, and be conſcious that it is our duty to repent of a temper and conduct ſo unworthy of our nature, and ſo unbecoming our obligations to its author; and to reſolve and endeavour to act a wiſer and a better part for the future. And if the Deity is conſidered as the father of mercies, who loves his creatures with infinite tenderneſs, and, in a particular manner, all good men; nay, who delights in goodneſs even in its moſt imperfect degrees; what reſignation, what dependence, what generous confidence, what hope in God, and in his allwiſe providence, muſt ariſe in the ſoul that is poſſeſſed of ſuch amiable views of him. We muſt further obſerve, that all thoſe affections which regard the Deity as their immediate and primary object, are vital energies of the ſoul, and conſequently exert themſelves into act, and, like all other energies, gain ſtrength or greater activity by that exertion: it is therefore our duty, as well as higheſt intereſt, often, at ſtated times, and by decent and ſolemn acts, to adore the great original of our exiſtence, to expreſs our veneration and love by a devout recognition of his perfections, and to evidence our gratitude by celebrating his goodneſs, and thankfully acknowledging all his benefits; by proper exerciſes of ſorrow and humiliation to confeſs our ingratitude and folly, to ſignify our dependence on God, our confidence in his goodneſs, and our reſignation to the diſpoſals of his providence, and this not only in private, but in public worſhip, where the preſence of our fellow-creatures and the powerful contagion of the ſocial affections, conſpire to kindle and ſpread the devout flame with greater warmth and energy.

Religion is divided into natural and revealed: by natural religion is meant that knowledge, veneration, and love of God, and the practice of thoſe duties to him, our fellow-creatures, and ourſelves, which are diſcoverable by the right exerciſe of our rational faculties, from conſidering the nature and perfections of God, and our relation to him and to one another. See ETHICS. And by revealed religion is meant, natural religion explained, enforced, and enlarged, from the expreſs declarations of God himſelf, from the mouths or pens of his prophets, *&c.*

Religion, in a more contracted ſenſe, is uſed for that ſyſtem of faith and worſhip, which obtains in ſeveral countries of the world; and even for the various ſects into which each religion is divided. See PAGANS, MAHOMETANS, JEWS, *&c.* ROMAN CATHOLICS, LUTHERANS, CALVINISTS, *&c.*

RELIGIOUS, in popiſh countries, is particularly uſed for a perſon engaged, by ſolemn vows, to the monaſtic life: or a perſon ſhut up in a monaſtery, to lead a life of devotion and auſterity, under ſome rule or inſtitution. See the articles MONK, NUN, *&c.*

RELIQUARY, a ſhrine or caſket, wherein the relics of a dead ſaint are kept.

RELIQUÆ, in roman antiquity, the aſhes and bones of the dead, that remained after burning their bodies; which were gathered up, put into urns, and afterwards depoſited in tombs. This word is alſo uſed for relics. See RELICS.

REMAINDER, in law, is an eſtate in lands, tenements, or rents, not to be enjoyed till after a term of years, or another perſon's deceaſe: thus, a perſon grants

lands or tenements to one perſon, for a term of years, or for life, and the remainder to another perſon for life, or in fee.

There is this difference between a remainder and a reverſion; in caſe of a reverſion, the eſtate granted, after the limited time, reverts to the grantor or his heirs; but by a remainder it goes to ſome third perſon, or a ſtranger.

REMAINDER, in mathematics, is what is left after taking a leſſer number out of a greater.

REMARRYING, marrying a ſecond time. See the article MARRIAGE.

REMEDY, in medicine, a preparation applied either internally or externally, for the cure of a diſeaſe. See PRESCRIPTION.

REMEMBRANCE, the ſame with memory. See the article MEMORY.

REMEMBRANCERS, antiently called clerks of the remembrance, certain officers in the exchequer, whereof three are diſtinguiſhed by the names of the king's remembrancer, the lord treaſurer's remembrancer, and the remembrancer of the firſt fruits. The king's remembrancer enters in his office, all recognizances taken before the barons, for any or the king's debts, for appearances or obſerving of orders; he alſo takes all bonds for the king's debts, *&c.* and makes out proceſſes thereon. He likewiſe iſſues proceſſes againſt the collectors of the cuſtoms, exciſe, and others, for their accounts; and informations upon penal ſtatutes, are entered and ſued in his office, where all proceedings in matters upon engliſh bills in the exchequer-chamber, remain. His duty further is to make out the bills of compoſitions upon penal laws, to take the ſtatement of debts; and into his office are delivered all kinds of indentures and other evidences, which concern the aſſuring any lands to the crown. He, every year, in craſtino animarum, reads in open court, the ſtatute for election of ſheriffs; and likewiſe openly reads in court, the oaths of all the officers, when they are admitted.

The lord treaſurer's remembrancer is charged to make out proceſs againſt all ſheriffs, eſcheators, receivers, and bailiffs, for their accounts. He alſo makes out writs of fieri facias, and extent for debts due to the king, either in the pipe or with the auditors; and proceſs for all ſuch revenue as is due to the king, on account of his tenures. He takes the account of ſheriffs; and alſo keeps a record, by which it appears whether the ſheriffs or other accountants pay their profers due at Eaſter and Michaelmas: and at the ſame time he makes a record, whereby the ſheriffs or other accountants keep their prefixed days: there are likewiſe brought into his office, all the accounts of cuſtomers, comptrollers, and accountants, in order to make entry thereof on record: alſo all eſtreats and amercements are certified here, *&c.*

The remembrancer of the firſt-fruits takes all compoſitions and bonds for the payment of firſt-fruits and tenths; and makes out proceſs againſt ſuch as do not pay the ſame.

REMINISCENCE, *reminiſcentia*, that power of the human mind, whereby it recollects itſelf, or calls again into its remembrance ſuch ideas or notions as it had really forgot: in which it differs from memory, which is a treaſuring up of things in the mind, and keeping them there, without forgeting them. See the article MEMORY.

Hence memory may be conſidered as a continual remembrance, and reminiſcence as an uninterrupted memory. How near akin ſoever theſe two faculties may ſeem, yet they are generally found ſeparated ſo, that they who excel in the one, are uſually defective in the other.

REMINISCERE, the ſecond Sunday in lent. See the article LENT.

REMISSION, in phyſics, the abatement of the power, or efficacy of any quality, in oppoſition to the increaſe of the ſame, which is called intenſion. In all qualities, capable of intenſion and remiſſion, the intenſion decreaſes reciprocally as the ſquares of the diſtances from the center of the radiating quality increaſe.

REMISSION, in medicine, is when a diſtemper abates, but does not go quite off before it returns again, as is common in fevers, which do not quite intermit.

REMISSION, in law, *&c.* denotes the pardon of a crime, or the giving up the puniſhment due thereto.

REMIT, in commerce. To remit a ſum of money, bill, or the like, is to ſend the ſum of money, *&c.*

To remit is alſo uſed among bankers, for what is uſually given a banker, or as it were diſcounted with him, for his giving a bill of exchange.

REMITTANCE, in commerce, the traffic or return of money from one place to another, by bills of exchange, orders, or the like.

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This word is alſo uſed in ſpeaking of the payment of a bill of exchange. It alſo ſignifies the fee or reward given a banker, both of his wages and the different value of the ſpecies in the places where you pay the money, and where he remits it.

REMITTER, in law. Where a perſon has two titles to lands, *&c.* and he comes to ſuch lands by the laſt title, which, proving defective, he ſhall be reſtored to, and adjudged in, by virtue of his former more antient title, this is called remitter. In caſe lands deſcend to a perſon, that had right to them before, he ſhall be remitted to his better title, if he pleaſes. Where a tenant in tail makes a feoffment of land, upon condition, after whoſe death, his iſſue within age enters, for the condition broken, he ſhall be firſt in as a tenant in fee, and be remitted as heir to his father: yet if the heir is of age, it will be no remitter to him, who is to bring his writ of formedon againſt the feoffee. Alſo if a tenant in tail infeoff his ſon or heir apparent, at that time under age, and afterwards dies, this is a remitter to the heir; but here it would be otherwiſe, were he of full age. By a remitter of iſſue in tail, all charges on the land are avoided; and where a perſon is remitted to an eſtate for life, the dower claimed by a widow may be gone; in which caſe alſo an eſtate is liable to be forfeited upon making a feoffment thereof, *&c.*

REMITTITUR, in law, an entry made in the king's bench, on a writ of error's abating in the exchequer chamber.

REMONSTRANCE, an expoſtluation or humble ſupplication, addreſſed to a king, or other ſuperior, beſeeching him to reflect on the inconveniences, or ill conſequences of ſome order, edict, or the like.

This word is alſo uſed for an expoſtulary counſel, or advice; or a gentle and handſome reproof, made either in general, or particular, to apprize or correct ſome fault, *&c.*

REMORA, the SUCK-FISH, in ichthyology, a genus of fiſh, the ſame with the echenis. See ECHENIS.

This ſingular fiſh grows to about nine inches in length, and more than two in diameter in the largeſt part of the body, which is near the head, whence it becomes gradually ſmaller to the tail; the back is convex, the belly flat, and the ſides are rounded by means of the ſtructure of its head. This fiſh applies itſelf firmly to any ſolid body that it pleaſes; and is frequently found ſticking to the bottom of ſhips, and often to large fiſh. See plate CCXXX. fig. 3.

REMOUNT, in war. To remount the cavalry, is to furniſh troopers or dragoons with freſh horſes, inſtead of ſuch as have been killed or diſabled in the ſervice.

REMOVER, in law, is where a ſuit is removed or taken out of one court into another; and is the oppoſite of remanding a cauſe, or ſending it back into the ſame court from whence it was firſt called.

REMPLY, in heraldry, ſomething filled up. The term is chiefly uſed to denote that the chief is quite filled up with a ſquare piece of another colour, leaving only a bordure of the proper colour of the chief, about the ſaid piece. See plate CCXXIX. fig. 6.

RENAL, ſomething belonging to the reins or kidneys. See the article KIDNEY.

For the renal glands, in anatomy, ſee the article CAPSULÆ ATRABILIARIÆ.

RENCOUNTER, in the military art, an engagement of two little bodies or parties of forces; in which ſenſe it ſtands in oppoſition to a pitched battle. See the article BATTLE.

In ſingle combats, rencounter is uſed by way of contradiſtinction to a duel, when perſons fall out and fight on the ſpot, without having premeditated the combat.

RENCOUNTRE, or RENCONTRE, in heraldry, is applied to animals when they ſhew the head in front, with both eyes, *&c.* or when the face ſtands right forward, as if they came to meet the perſon before them.

RENDER, in law, ſignifies to yield or return a thing; and it is frequently made uſe of, in the levying of a fine, which is either ſingle, on which nothing is given or rendered back by the cogniſee; or double, containing a grant or render back of rent, *&c.* out of the land, to the cogniſor. In another ſenſe of this word, it is obſerved, that there are ſome things in a manor which lie in prender, that is, which may be taken by the lord or his officer, when they happen without any offer made by the tenant, ſuch as eſcheats, *&c.* and there are ſome that lie in render, *viz.* ſuch as may be rendered or anſwered by the tenant, as rents, heriots, and other ſervices.

RENDEZVOUS, or RENDEVOUS, a place appointed to meet in, at a certain day and hour.

RENEALMIA, in botany, a genus of the *hexandria-monogynia* claſs of plants, the corolla whereof is long, erect, and of the infundibuliform-kind; the tube is of the length of the calyx; the limb is ſhort, plane, and divided into three ſegments; the fruit is an ovato-oblong capſule, rounded, pointed at the edge and marked with three furrows, formed of three valves, and containing three cells; the ſeeds are numerous, oblong, and have each a capillary plume.

RENEGATE, or RENEGADO, a perſon who has apoſtatized or renounced the chriſtian faith, to embrace ſome other religion, particularly mahometaniſm.

RENES SUCCENTURIATI, in anatomy, the ſame with the capſulæ atrabiliariæ. See CAPSULÆ ATRABILIARIÆ.

RENFREW, a town of Scotland, the capital of the county of Renfrew, ſituated on the river Clyde, forty-ſix miles weſt of Edinburgh.

RENIFORM, ſomething reſembling the figure or ſhape of the kidneys. See the article KIDNEY.

RENITENCY, *renitentia*, among philoſophers, that force in ſolid bodies, whereby they reſiſt the impulſe of other bodies, or re-act as much as they are acted on. See the article REACTION, *&c.*

RENNES, a city of France, capital of the province of Britany, ſituated on the river Villaine: weſt long. 1° 45′, north lat. 48° 5′.

RENNET. See the article RUNNET.

RENT, *reditus*, in law, a ſum of money, or other conſideration, iſſuing yearly out of lands or tenements.

Rents are uſually diſtinguiſhed into three kinds, *viz.* Rent-ſervice, rent-charge, and rent-ſec. Rent-ſervice is where a perſon holds lands of his lord by fealty and certain rent, whilſt the reverſion of lands continues in the grantor; and if his rent be behind-hand, the landlord may diſtrain for it, without any covenant, *&c.* Rent-charge is where a perſon, by deed, makes over his eſtate in fee-tail, or for term of life, where the whole intereſt does paſs; yet, by the ſame deed, reſerves to himſelf a ſum of money, to be paid him yearly, with a clauſe therein, impowering him to diſtrain in caſe of non-payment. Rent-ſec, or a dry-rent, is that which a perſon, making over his eſtate by deed, reſerves yearly to be paid him, without any clauſe of diſtreſs contained in the deed.

To theſe may be added a rent reſerved on leaſes at will, called rents diſtrainable of common right: but this rent is due by the poſſeſſion only, which therefore muſt be proved; whereas in leaſes for years the rent becomes due on the contract, and the leſſee muſt pay the ſame, though he never enters on the land. A perſon may alſo hold a rent by preſcription, as where he and his anceſtors have been ſeiſed thereof, and uſed to diſtrain for it, when in arrears, *&c.*

RENTAL ſignifies a roll in which the rents of manors are ſet down, in order for the lord's bailiff, thereby to collect the ſame. It contains the lands let to each tenant, with their names, and the ſeveral rents ariſing.

RENTERING, in the manufactories, the ſame with fine-drawing. See the article *Fine*-DRAWING.

RENVERSE', INVERTED, in heraldry, is when any thing is ſet with the head downwards, or contrary to its natural way of ſtanding. Thus, a chevron renverſé, is a chevron with the point downwards. They uſe alſo the ſame term when a beaſt is laid on its back.

RENUENTES, in anatomy, a pair of muſcles of the head, thus called as being antagoniſts to the annuentes, and ſerving to throw the head backwards. See the article ANNUENTES.

RENUNCIATION, *renunciatio*, the act of renouncing, abdicating, or relinquiſhing any right, real or pretended. Renunciations are ſometimes expreſs, as by contracts, *&c.* ſometimes tacit, as by contrary acts. To renounce an inheritance, a community, *&c.* is to paſs a ſolemn act before a notary or public officer, whereby a perſon declares he will not intermeddle in an inheritance or profit in a company, but ſurrenders his part and quits all pretenſions.

REPAIRING, or REPARATION, *reparatio*, the act of retrieving, mending, or eſtabliſhing a building or other work damaged or gone to decay. In reſpect to reparations, if a tenant or leſſee covenants that from and after the amendment of the tenements by the leſſor he will, at his own charge, keep and leave them in repair, in that caſe the leſſee is not obliged to do the ſame until the leſſor has firſt made good the reparations; and here if a houſe be well repaired at firſt, when the leaſe began, and afterwards decays, it is ſaid the landlord muſt put it in repair before the tenant is bound to keep it ſo.

REPARATIONE FACIENDA, is a writ that lies in divers caſes, one of which is where there are tenants in common or joint tenants of a mill or houſe that is fallen to decay, and one of them is willing to repair the ſame, but the others will not, in which caſe the party that is willing to repair it ſhall have this writ againſt the perſons refuſing. Alſo if a perſon has a paſſage over a bridge, and another ought to repair the ſame, but ſuffers it to decay, *&c.* this writ lies.

REPARTEE, or REPARTY, a ready ſmart reply, eſpecially in matters of wit, humour, or raillery.

REPARTITION, a dividing or ſharing a thing a ſecond time.

REPAST, a meal or refection taken at a ſtated hour.

In our old law books it is particularly uſed for a meal's meat given to ſervile tenants while at work for their lord.

REPEALING, in law, the revoking or annulling of a ſtatute, or the like. See ABROGATION and REVOCATION.

No act of parliament ſhall be repealed the ſame ſeſſion in which it was made. A deed or will may be repealed for a part, and ſtand good for the reſt. It is held that a pardon of felony may be repealed on diſproving the ſuggeſtion thereof.

REPEAT, in muſic, a character ſhewing that what was laſt played or ſung muſt be repeated or gone over again. See the article REPETITION.

The repeat ſerves inſtead of writing the ſame thing twice over: there are two kinds of repeats, the great and ſmall; the firſt is a double bar dotted on each ſide, or a double bar dotted in the middle, or two parallel lines drawn perpendicularly acroſs the ſtaff, with dots on either hand. The form of which may be ſeen under CHARACTER *in muſic*. This ſhews that the preceding ſtrain is to be repeated, that is, if it be near the beginning of the piece, all hitherto ſung or played is to be repeated; or if towards the end thereof, all from ſuch another mark. In gavots we uſually find the repeat at about a third part of the piece. In minuets, borees, courants, *&c.* towards the end, or in the laſt ſtrain: ſome make this a rule, that if there be dots on each ſide of the bars, they direct a repetition both of the preceding and following ſtrains; if there be only dots on one ſide the ſtrain, that ſide alone is to be ſung or played over again. The ſmall repeat is when ſome of the laſt meaſures of a ſtrain are to be repeated. This is denoted by a character ſet over the place where the repeat begins (ſee CHARACTER *in muſic*) and continues to the end of the ſtrain.

REPEATING WATCHES. See WATCH.

REPEHAM, a market-town of Norfolk, ſituated eight miles north-weſt of Norwich.

REPELLENTS, in medicine, remedies which drive back a morbid humour into the maſs of blood from which it was unduly ſecreted. To underſtand rightly, ſays Quincy, the operation of repellents, it may be obſerved, that theſe are medicines which prevent ſuch an afflux of a fluid to any particular part as would raiſe it into a tumour; but to know how this may be effected, we muſt advert, that all tumours ariſe either from an increaſe in the velocity or quantity of the fluids, or a weakneſs in ſome particular part; and ſometimes both concur. An increaſe in the velocity of the fluids makes them more forcibly puſh againſt and diſtend all the parts in their circuit. If, therefore, any part be unequally preſſed or relaxed by external injuries, that will be more elevated than any other, and for want of equal reſiſtance with the reſt of the body, will at length receive ſuch a quantity of fluid as will raiſe it into a tumour, eſpecially if any of its veſſels be obſtructed; becauſe the protruſion of freſh matter a tergo, will continue to add thereto until the part is upon the utmoſt ſtretch, and can hold no more. In this caſe all thoſe means are ſaid to be repellent which check the growth of the tumour, and aſſiſt the refluent blood in taking up the obſtructed matter, and waſhing it again into the common ſtream. This intention is chiefly anſwered by evacuation and revulſion; for whatever leſſens the quantity of the fluid, will diminiſh the force upon the tumified part. A medicine comes to be repellent by conſiſting of ſuch ſubtil parts as may tranſmit ſome of them through the pores, and help to render the obſtructed matter more fluid, ſo that it comes the more eaſy to be looſened, and fall again into the circulating current. But in this caſe there is a hazard of ſuch things likewiſe putting the obſtructed humour into a ferment, whereby it ſooner turns into pus, and then comes under the denomination of ſuppuratives or ripeners. What, therefore, in the moſt ſtrict ſenſe, is to be reputed a repeller, is that which aſtringes and ſtrengthen

thens the part ſo as to make it reſiſt any ſuch lodgment. Theſe are ſuch whoſe qualities are moſt manifeſt in their coldneſs and drying properties; but there are ſo few inſtances wherein bandage is not better than any ſuch application, that very little comes to be uſed for that purpoſe. In hæmorrhages and ouſings out of ſerum, ſo as to deform the ſkin, ſimples of this nature moſtly take place, which anſwer their ends by aſtringing the fibres, whence thoſe apertures are ſo cloſed as not to admit through them afterwards any ſuch fluid. See TUMOUR, *&c.*

The moſt remarkable in the claſs of repellents are the white of an egg, the lapis calaminaris, litharge of gum, red-lead, tutty, pampholyx, houſe-leek, putty, and cobweb. See EGG, *&c.*

REPELLING POWER, *vis repellens*, in phyſics. See the article REPULSION.

REPERCUSSION, in mechanics. See the article REFLECTION.

REPERCUSSION, in muſic, a frequent repetition of the ſame ſound. See the article REPETITION.

This often happens in the modulation, where the eſſential chords of each mode of the harmonical triad are to be ſtruck oftener than the reſt: and of theſe three chords the two extremes, *i. e.* the final and the predominant one (which are properly the repercuſſions of each mode) oftener than the middle one.

REPERTORY, *repertorium*, a place wherein things are orderly diſpoſed, ſo as to be eaſily found when wanted. The indices of books are repertories, ſhewing where the matters ſought for are treated of. Common-place books are alſo kinds of repertories.

REPETITION, *repetitio*, the reiterating of an action.

REPETITION, in muſic, denotes a reiterating or playing over again the ſame part of a compoſition, whether it be a whole ſtrain, part of a ſtrain, or double ſtrain, *&c.* The repetition is denoted by a character called a repeat, which is varied ſo as to expreſs the various circumſtances of a repeat. See REPEAT.

When the ſong ends with a repetition of the firſt ſtrain, or part of it, the repetition is denoted by *da capo*, or D. C. *i. e.* from the beginning.

Repetition or reply is alſo uſed in muſic when after a little ſilence one part repeats or runs over the ſame notes, the ſame intervals, the ſame motions, and, in a word, the ſame ſong which a firſt part had already gone over during the ſilence of this, and is nearly the ſame with figure. See FIGURE and IMITATION.

Repetition, or reply, is alſo a doubling, trebling, *&c.* of an interval or a reiteration of ſome conſonance or diſſonance, as a fifteenth is a repetition of the octave, *i. e.* double octave, or ſecond octave. See the articles OCTAVE and INTERVAL.

REPETITION, in rhetoric, a figure which gracefully and emphatically repeats either the ſame word, or the ſame ſenſe in different words.

In the uſe of this figure care is to be uſed that we run not into inſipid tautologies, nor affect a trifling ſound and chime of inſignificant words. All turns and repetitions are ſo that do not contribute to the ſtrength and luſtre of the diſcourſe, or at leaſt one of them. The nature and deſign of this figure is to make deep impreſſions on thoſe we addreſs. It expreſſes anger and indignation, full aſſurance of what we affirm, and a vehement concern for what we have eſpouſed.

REPLANTING, in gardening, the act of planting a ſecond time. See the article PLANTING.

REPLEADER, *replacitare*, in law, is to plead over again what was once pleaded before.

REPLEGIARE, in law, ſignifies to redeem a thing taken or detained by another, by putting in legal ſureties.

REPLEGIARE DE AVERIIS, is a writ which is brought by him whoſe cattle is diſtrained or impounded for any cauſe by another perſon, on ſecurity being given to the ſheriff to proſecute or anſwer the action at law.

REPLETION, in medicine, a plenitude or plethora. See PLETHORA.

Repletion is more dangerous than inanition. Bleeding and diet are the great reſources whence a perſon is incommoded with a repletion.

Repletion is ſometimes alſo uſed where the ſtomach is overloaden with too much eating or drinking. The phyſicians hold all repletion to be prejudicial, but that of bread is of all others the worſt.

REPLETION, in the canon law, is where the revenue of a benefice or benefices is ſufficient to fill or occupy the whole right or title of the graduate who holds them. Where there is a repletion, the party can demand no more by virtue of his degrees. In England, where benefices are not appropriated to degrees, repletion, ſtrictly ſpeaking, has no place.

REPLEVIN,

REPLEVIN, in law, a remedy granted on a diſtreſs, by which the firſt poſſeſſor has his goods reſtored to him again, on his giving ſecurity to the ſheriff that he will purſue his action againſt the party diſtraining, and return the goods or cattle, if the taking them ſhall be adjudged lawful.

In a replevin the perſon diſtrained becomes plaintiff, and the perſon diſtraining is called the defendant or avowant, and his juſtification an avowry.

At the common law replevins are by writ, either out of the king's bench or common pleas; but by ſtatute, they are by plaint in the ſheriff's court, and court-baron, for a perſon's more ſpeedily obtaining the goods diſtrained.

If a plaint in replevin be removed into the court of king's bench, &c. and the plaintiff makes default and becomes non-ſuit, or judgment is given againſt him, the defendant in replevin ſhall have the writ of retorno habendo of the goods taken in diſtreſs. See the article REPLEVY.

REPLEVISH, in law, ſignifies to admit one to mainpriſe upon ſurety. See the article MAINPRISE.

REPLEVY, in law, is a tenant's bringing a writ of replevin, or replegiari facias, where his goods are taken by diſtreſs for rent; which muſt be done within five days after the diſtreſs, otherwiſe at the five days end, they are to be appraiſed and ſold. 2 W. and M. c. 5.

This word is alſo uſed for bailing a perſon, as in the caſe of a homine replegiando.

REPLICATION, in logic, the aſſuming or uſing the ſame term twice in the ſame propoſition.

REPLICATION, in the courts of common law, ſignifies an exception or anſwer made by the plaintiff to the defendant's plea; in the court of chancery, it is what the complainant replies to the defendant's anſwer.

REPORT, the relation made upon oath, by officers or perſons appointed to viſit, examine, or eſtimate the ſtate, expences, &c. of any thing.

REPORT, in law, is a public relation of caſes judicially argued, debated, reſolved or adjudged in any of the king's courts of juſtice, with the cauſes and reaſons of the ſame, as delivered by the judges. Alſo when the court of chancery, or any other court, refers the ſtating of a caſe, or the comparing of an account to a maſter of chancery, or other referee, his certificate thereon is called a report.

REPOSE, in poetry, &c. the ſame with reſt and pauſe. See REST, &c.

REPOSE, in painting, certain maſſes or large aſſemblages of light and ſhade, which being well conducted, prevent the confuſion of objects and figures, by engaging and fixing the eye ſo as it cannot attend to the other parts of the painting for ſome time; and thus leading it to conſider the ſeveral groups gradually, proceeding, as it were, from ſtage to ſtage.

REPOSITORY, a ſtone houſe, or place in which things are laid up, and preſerved.

In this ſenſe we ſay, the repoſitory of the royal ſociety. See MUSEUM.

REPRESENTATION, in the drama, the exhibition of a theatrical piece, together with the ſcenes, machines, &c.

REPRESENTATIVE, one who perſonates or ſupplies the place of another, and is inveſted with his right and authority. Thus the houſe of commons are the repreſentatives of the people in parliament. See PARLIAMENT.

REPRIEVE, or REPRIVE, in law, is ſuſpending or deferring the execution of the law upon a priſoner for a certain time; or a warrant from the king for deferring the execution of a perſon condemned.

Every judge, who has the power of paſſing ſentence on criminals, has alſo the power to reprieve them: but in London, no perſon convicted of felony can be reprieved without the king's warrant. However, where a woman is condemned for treaſon or felony, and, upon pleading her belly, is found to be quick with child, execution is of courſe reſpited, and the woman becomes reprieved till her delivery: but this favour can only be granted once. The execution of offenders is frequently ſtayed by reprieve, upon condition of tranſportation.

REPRISALS, a right which princes claim of taking from their enemies any thing equivalent to what they unjuſtly detain from them.

Repriſals is alſo uſed for a letter of marque granted by a prince to his ſubject. See the article MARQUE.

REPRISE, or REPRIZE, at ſea, is a merchant-ſhip which, after its being taken by a corſair, privateer, or other enemy, is retaken by the oppoſite party.

If a veſſel thus retaken has been twenty-four hours in the poſſeſſion of the enemy,

it is deemed a lawful prize; but if it be retaken within that time, it is to be reſtored to the proprietor, with every thing therein, upon his allowing one third to the veſſel who made the repriſe. Alſo if the repriſe has been abandoned by the enemy, either in a tempeſt or from any other cauſe, before it has been led into any port, it is to be reſtored to the proprietor.

REPRIZES, in law, are deductions or payments annually made out of a manor or lands; as rent-charges, penſions, annuities, *&c.*

REPROBATION, in theology, a decree by which God is ſuppoſed either from all eternity, or from the creation of the world, to conſign over to eternal miſery the greateſt part of mankind, and to ſave none of the human race, except thoſe whom he made the heirs of glory by election.

Caſuiſts diſtinguiſh two kinds of reprobation, poſitive and negative. Poſitive reprobation, is that by which God is ſuppoſed to create men with a poſitive and abſolute reſolution to damn them eternally: and negative reprobation, is that whereby God, though he creates all men with a ſincere deſire to ſave them, and furniſhes them with all the neceſſary means of ſalvation, ſo that all may be ſaved that will; yet ſees there are ſeveral who will not do it, with the aids he ſhall afford them, and ſees, at the ſame time, they would do it with certain other aids, which he ſees, but will not give them.

REPRODUCTION, the act whereby a thing is produced anew, or grows a ſecond time.

The reproduction of ſeveral parts of lobſters, crabs, *&c.* is one of the greateſt curioſities in natural hiſtory. It ſeems, indeed, inconſiſtent with the modern ſyſtem of generation, which ſuppoſes the animal to be wholly formed in the egg; that, in lieu of the organical part of an animal cut off, another ſhould ariſe perfectly like it: the fact, however, is too well atteſted to be denied. The legs of lobſters, *&c.* conſiſt each of five articulations; now when any of the legs happen to break, by any accident, as by walking, *&c.* which frequently happens, the fracture is always found to be at the future near the fourth articulation; and what they thus loſe, is exactly reproduced in ſome time afterwards; that is, a part of the leg ſhoots out, conſiſting of four articulations, the firſt whereof has two claws, as before; ſo that the loſs is entirely repaired.

If the leg of a lobſter be broken off by deſign at the fourth or fifth articulation, what is thus broke off is always reproduced. But, if the fracture be made in the firſt, ſecond, or third articulation, the reproduction is not ſo certain. And it is very ſurprizing, that, if the fracture be made at theſe articulations, at the end of two or three days, all the other articulations are generally found broke off to the fourth, which, it is ſuppoſed, is done by the creature itſelf, to make the reproduction certain. The part reproduced is not only perfectly ſimilar to that retrenched, but alſo, in a certain ſpace of time, grows equal to it. Hence it is that we frequently ſee lobſters, which have their two large legs unequal, in all proportions. And, if the part reproduced be broken off, a ſecond will ſucceed.

REPTILES, in natural hiſtory, a kind of animals denominated from their creeping or advancing on the belly. Or reptiles are a genus of animals and inſects, which, inſtead of feet, reſt on one part of the body, while they advance forward with the reſt.

Such are earthworms, ſnakes, caterpillars, *&c.* Indeed, moſt of the claſs of reptiles have feet; only thoſe very ſmall, and the legs remarkably ſhort in proportion to the bulk of the body.

Naturaliſts obſerve a world of artful contrivance for the motion of reptiles. Thus, particularly in the earth-worm, Dr. Willis tells us, the whole body is only a chain of annular muſcles; or, as Mr. Derham ſays, it is only one continued ſpiral muſcle, the orbicular fibres whereof being contracted, render each ring narrower and longer than before; by which means it is enabled, like the worm of an augre, to bore its paſſage into the earth. Its reptile motion might alſo be explained by a wire wound on a cylinder, which when ſlipped off, and one end extended and held faſt, will bring the other near to it. So the earth-worm having ſhot out or extended his body (which is with a wreathing) it takes hold by theſe ſmall feet it hath, and ſo contracts the hinder part of its body. Dr. Tyſon adds, that when the fore-part of the body is ſtretched out, and applied

plied to a plane at a diſtance, the hind part relaxing and ſhortening is eaſily drawn towards it as a center.

Its feet are diſpoſed in a quadruple row the whole length of the worm, with which, as with ſo many hooks, it faſtens down ſometimes this and ſometimes that part of the body to the plane, and at the ſame time ſtretches out or drags after it another.

The creeping of ſerpents is effected after a ſomewhat different manner; there being a difference in their ſtructure, in that theſe laſt have a compages of bones articulated together.

The body here is not drawn together, but as it were complicated; part of it being applied on the rough ground, and the reſt ejaculated and ſhot from it, which, being ſet on the ground in its turn, brings the other after it. The ſpine of the back variouſly wreathed has the ſame effect in leaping, as the joints in the feet of other animals; they make their leaps by means of muſcles, and extend the plicæ or folds.

REPTILE is alſo uſed, by ſome botanical writers, to ſignify plants which creep upon the earth, unleſs ſuſtained by ſome other plant, prop, *&c.* As cucumbers, melons, the vine, *&c.*

REPUBLIC, *reſpublica*, commonwealth, a popular ſtate or government; or a nation where the people have the government in their own hands.

REPUBLIC *of letters*, a phraſe uſed collectively of the whole body of the people of ſtudy and learning.

REPUDIATION, *repudium*, in the civil law, the act of divorcing. See DIVORCE.

REPULSION, *repulſio*, in phyſics, that property in bodies, whereby, if they are placed juſt beyond the ſphere of each other's attraction of cohesion, they mutually fly from each other.

Thus if an oily ſubſtance, lighter than water, be placed on the ſurface thereof, or if a piece of iron be laid upon mercury, the ſurface of the fluid will be depreſſed about the body laid on it: this depreſſion is manifeſtly occaſioned by a repelling power in the bodies, which hinders the approach of the fluid towards them. But it is poſſible, in ſome caſes, to preſs or force the repelling bodies into the ſphere of one another's attraction; and then they will mutually tend toward each other, as when we mix oil and water till they incorporate.

Dr. Knight defines repulſion to be that cauſe which makes bodies mutually endeavour to recede from each other, with different forces, at different times; and that ſuch a cauſe exiſts in nature, he thinks evident for the following reaſons. 1. Becauſe all bodies are electrical, or capable of being made ſo; and it is well known, that electrical bodies both attract and repel. 2. Both attraction and repulſion are very conſpicuous in all magnetical bodies. 3. Sir Iſaac Newton has ſhewn from experiments, that the ſurfaces of two convex-glaſſes repel each other. 4. The ſame great philoſopher has explained the elaſticity of the air, by ſuppoſing its particles mutually to repel each other. 5. The particles of light are, in part at leaſt, repelled from the ſurfaces of all bodies. 6. Laſtly, it ſeems highly probable, that the particles of light mutually repel each other, as well as the particles of air.

The ſame gentleman aſcribes the cauſe of repulſion, as well as that of attraction, to the immediate effect of God's will; and as attraction and repulſion are contraries, and conſequently cannot, at the ſame time, belong to the ſame ſubſtance, the doctor ſuppoſes there are in nature two kinds of matter, one attracting, the other repelling; and that thoſe particles of matter which repell each other, are ſubject to the general law of attraction in reſpect of other matter. A repellent matter being thus ſuppoſed, equally diſperſed through the whole univerſe, the doctor attempts to account for many natural phænomena by means thereof. He thinks light is nothing but this repellent matter put into violent vibrations, by the repellent corpuſcles which compoſe the atmoſphere of the ſun and ſtars; and that, therefore, we have no reaſon to believe they are gulphs of fire, but, like the reſt of the heavenly bodies, inhabitable worlds. From the ſame principles, he attempts to explain the nature of fire and heat, the various phænomena of the magnet, and the cauſe of the variation of the needle: and, indeed, it is difficult, if not impoſſible, by the doctrine of attraction alone, to account for all the phænomena obſervable in experiments made with magnets, which may now be ſolved by admitting this doctrine of a repellent fluid; but whether it will be ſufficient to account for all the particular phænomena of nature, which are the proper teſts of an hypotheſis, time and experience alone muſt determine.

The doctor alſo endeavours to ſhew, that the attractions of coheſion, gravity and magnetiſm are the ſame, and that by theſe two active principles, *viz.* attraction and repulſion, all the phænomena of nature may be explained; but as his ingenious treatiſe on this ſubject is laid down in a ſeries of propoſitions, all connected together, it would be impoſſible to do juſtice to his arguments, without tranſcribing the whole: we ſhall therefore refer the curious to the book itſelf.

According to 'sGraveſande and others, when light is reflected from a poliſhed ſpherical ſurface, the particles of light do not ſtrike upon the ſolid parts, and ſo rebound from them; but are repelled from the ſurface, at a ſmall diſtance before they touch it, by a power extended all over the ſaid poliſhed ſurface. And Sir Iſaac Newton obſerves, that the rays of light are alſo expelled by the edges of bodies, as they paſs near them; ſo as to make their ſhadows, in ſome caſes, larger than they would otherwiſe be. See 's Graveſande's Introd. P. I. n° 40 to 44. and Sir Iſaac Newton's Optics, B. II. P. III. prop. 8. and B. III. P. I. where this repulſive force is illuſtrated from other phænomena.

REQUENA, a town of New Caſtile, forty-five miles weſt of Valencia.

REQUEST, in law, a ſupplication or petition preferred to a prince, or to a court of juſtice; begging relief in ſome conſcionable caſes where the common law grants no immediate redreſs.

Court of REQUESTS, an antient court of equity, inſtituted about the nineteenth year of Henry VII. See COURT.

In the fortieth and forty firſt years of queen Elizabeth, it was adjudged, upon ſolemn argument, in the court of common-pleas, that the court of requeſt was then no court of equity.

REQUIEM, in the romiſh church, a maſs ſung for the reſt of the ſoul of a perſon deceaſed. See the article MASS.

RESARCELE'E, in heraldry, is where a ſlender croſs is charged upon another, as repreſented in plate CCXXXI. fig. 4.

RESCEIT, *receptio*, in law, an admiſſion or receiving of a third perſon to plead his right, in a cauſe formerly commenced between the other two.

RESCHT, the capital of the province of Gilan, in Perſia, ſituated on the ſouth-weſt coaſt of the Caſpian ſea.

RESCISSION, *reſciſſio*, in the civil law, an action intended for the annulling, or ſetting aſide, any contract, deed, *&c.*

RESCOUS, or RESCUE, in law, an illegal taking away and ſetting at liberty a diſtreſs taken, or a perſon arreſted, by proceſs, or courſe of law. See the article DISTRESS, *&c.*

Reſcous, in matters relating to treaſon, is deemed treaſon; and in matters concerning felony, is felony.

RESCRIPT, *reſcriptum*, an anſwer delivered by an emperor, or a pope, when conſulted by particular perſons, on ſome difficult queſtion, or point of law; to ſerve as a deciſion thereof.

RESEARCH, a ſcrutiny, or diligent enquiry into any thing.

RESEARCH, in muſic, is a kind of prelude or voluntary played on the organ, *&c.* wherein the performer ſeems to ſearch or look out for the ſtrains and touches of harmony, which he is to uſe in the regular piece to be played afterwards. See the article PRELUDE.

RESEARCHING, in ſculpture, the repairing of a caſt figure, *&c.* with proper tools; or the finiſhing it with art and exactneſs, ſo as the minuteſt parts may be well defined.

RESEDA, BASE-ROCKET, in botany, a genus of *polyandria-trigynia* claſs of plants, the corolla of which conſiſts of certain unequal petals, ſome one of which is always ſemitrifid; and its fruit is a gibboſe and angulated capſule, containing one cell, with numerous kidney-ſhaped ſeeds.

RESERVATION, in law an action or clauſe whereby ſomething is refenced, or ſecured to one's ſelf.

Mental RESERVATION, a propoſition, which ſtrictly taken, and according to the natural import of the terms, is falſe; but, if qualified by ſomething concealed in the mind, becomes true.

Mental reſervations are the great refuge of religious hypocrites, who uſe them to accommodate their conſciences with their intereſts: the jeſuits are zealous advocates for mental reſervations; yet are they real lyes, as including an intention to deceive.

RESERVE, in law, the ſame with reſervation. See the article RESERVATION.

Body of RESERVE, or *corps de* RESERVE, in military affairs, the third or laſt line of an army, drawn up for battle; ſo called becauſe they are reſerved to ſuſtain the reſt,

reſt, as occaſion requires; and not to engage, but in caſe of neceſſity.

RESERVOIR, a place where water is collected and reſerved, in order to be conveyed to diſtant places through pipes, or ſupply a fountain, or jet d'eau.

RESET, in law, the receiving or harbouring an outlawed perſon. See the article OUTLAWRY.

RESIDENCE, in the canon and common law, the abode of a perſon, or incumbent, upon his benefice; and his aſſiduity in attending on the ſame.

RESIDENT, a public miniſter, who manages the affairs of a kingdom or ſtate, at a foreign court.

They are a claſs of public miniſters inferior to ambaſſadors or envoys; but, like them, are under the protection of the law of nations.

RESIDENTIARY, *reſidentiarius*, a canon inſtalled into the privileges and profits of reſidence.

RESIDUAL FIGURE, in geometry, the figure remaining after ſubtracting a leſſer from a greater.

RESIDUAL ROOT, in algebra, a root compoſed of two parts or members, connected together by the ſign —.

Thus $x-y$ is a reſidual root, ſo called, becauſe its value is no more than the difference between its parts x and y.

RESIDUE, *reſiduum*, the remainder or balance of an account, debt, or obligation.

RESIGNATION, in the canon law, the ſurrendering a benefice into the hands of the collator, or biſhop.

RESIGNEE, in law, the perſon to whom a thing is reſigned.

RESIN, in natural hiſtory, a viſcid juice ouzing either ſpontaneouſly, or by inciſion, from ſeveral trees, as the pine, fir, *&c.*

For the difference between reſins and gums, ſee the article GUM.

Natural reſins are either ſolid or fluid. Of the ſolid reſins, ſome are uſed more frequently in medicine, as ſtorax, benjamin, maſtich, olibanum, elemi, lac, dragons-blood, and camphor; and others more rarely, as anime, copal, caranna, tacliamahaca, ladanum, ſandarach, *&c.* See STORAX, BENJAMIN, *&c.*

The liquid reſins, uſed in medicine, are leſs numerous, *viz.* balſam of gilead, of peru, of tolu, of capivi, turpentine, liquid amber, and liquid ſtorax. See the articles BALSAM, TURPENTINE, *&c.*

All reſins are uſed, more or leſs, in all officinal plaſters; both as being ripeners and drawers, and becauſe they give a due conſiſtence and tenacity.

The reſins of vegetables may be prepared nearly in the ſame manner as extracts, by uſing rectified ſpirit of wine inſtead of water: for ſuch a ſpirit is the only proper menſtruum that will diſſolve the groſſer reſinous matter of vegetables, as water is of the mucilaginous and ſaline parts; yet theſe principles are ſo intimately combined in almoſt all plants, that whichever of theſe liquors is applied at firſt, it will take up a portion of what is directly ſoluble only in the other: hence ſundry vegetables, extremely reſinous, and whoſe virtues conſiſt chiefly in their reſin, afford nevertheleſs very uſeful extracts with water, though not equal to thoſe obtained by a prudent application of ſpirit. See EXTRACT.

The indiſſolubility of pure reſins in aqueous fluids, and their tenacious quality by which they ſtick to the coats of the inteſtines, occaſion gripes and other inconveniencies; ſo that it is not ſafe to give them alone: the better way of fitting them for internal uſe, is by triturating them with the teſtaceous powders, or with almonds, into the form of an emulſion; or by diſſolving them in ſpirit of wine, and mixing the ſolution with a proper quantity of ſyrup. Six or eight grains of the reſin of jalap, or ſcammony, managed in this manner, prove powerfully cathartic without griping, or greatly diſordering the body.

For the preparation of the reſins, ſee the articles JALAP, SCAMMONY, *&c.*

RESISTANCE, or RESISTING FORCE, in philoſophy, denotes, in general, any power which acts in an oppoſite direction to another, ſo as to deſtroy or diminiſh its effect.

Hence the force wherewith bodies, moving in fluid mediums, are impeded or retarded, is the reſiſtance of thoſe fluids. See the article FLUID.

Authors have eſtabliſhed it as a certain rule, that, whilſt the ſame body moves in the ſame medium, it is always reſiſted in the duplicate proportion of its velocity; that is, if the reſiſted body move in one part of its track, with three times the velocity with which it moved in ſome other part, then its reſiſtance to the greater velocity will be nine times the reſiſtance to the leſſer: if the velocity in one place be four times the velocity in another, the reſiſtance to the greater velocity will be

ſixteen

ſixteen times the reſiſtance to the leſſer, and ſo on. This rule, though exceſſively erroneous, when taken in a general ſenſe, is yet undoubtedly very near the truth, when confined within certain limits.

In order to conceive the reſiſtance of fluids to a body moving in them, Mr. Robins diſtinguiſhes between thoſe fluids, which being compreſſed by ſome incumbent weight, perpetually cloſe up the ſpace deſerted by the body in motion, without permitting, for an inſtant, any vacuity to remain behind it; and thoſe fluids in which, they being not ſufficiently compreſſed, the ſpace left behind the moving body remains for ſome time empty. Theſe differences, in the reſiſting fluids, will occaſion very remarkable varieties in the laws of their reſiſtance, and are abſolutely neceſſary to be conſidered in the determination of the action of the air in ſhot and ſhells; for the air partakes of both theſe affections, according to the different velocities of the projected body.

If a fluid was ſo conſtituted that all the particles compoſing it were at ſome diſtance from each other, and there was no action between them, then the reſiſtance of a body moving therein, would be eaſily computed from the quantity of motion communicated to theſe particles: for inſtance, if a cylinder moved in ſuch a fluid in the direction of its axis, it would communicate to the particles it met with a velocity equal to its own, and in its own direction, ſuppoſing that neither the cylinder, nor the parts of the fluid were elaſtic; whence, if the velocity and diameter of the cylinder be known, and alſo the denſity of the fluid, there would thence be determined the quantity of motion communicated to the fluid, which (action and re-action being equal) is the ſame with the quantity loſt by the cylinder, conſequently the reſiſtance would be hereby aſcertained.

In this kind of diſcontinued fluid, the particles being detached from each other, every one of them can purſue its own motion in any direction, at leaſt for ſome time, independent of the neighbouring ones; wherefore, if inſtead of a cylinder moving in the direction of its axis, a body, with a ſurface oblique to its direction, be ſuppoſed to move in ſuch a fluid, the motion the parts of the fluid will hereby acquire, will not be in the direction of the reſiſted body, but perpendicular to its oblique ſurface; whence the reſiſtance to ſuch a body will not be eſtimated from the whole motion communicated to the particles of the fluid, but from that part of it only which is in the direction of the reſiſted body. In fluids then, where the parts are thus diſcontinued in each other, the different obliquities of that ſurface, which goes foremoſt, will occaſion conſiderable changes in the reſiſtance; although the ſection of the ſolid, by a plain perpendicular to its direction, ſhould in all caſes be the ſame. And Sir Iſaac Newton has particularly determined, that in a fluid thus conſtituted, the reſiſtance of a globe is but half the reſiſtance of a cylinder of the ſame diameter, moving in the direction of its axis with the ſame velocity.

But though the hypotheſis of a fluid, thus conſtituted, be of great uſe in explaining the nature of reſiſtances; yet, in reality, no ſuch fluid does exiſt within our knowledge: all the fluids with which we are converſant are ſo formed, that their particles either lie contiguous to each other, or at leaſt act on each other in the ſame manner as if they did; conſequently, in theſe fluids, no one particle, contiguous to the reſiſted body, can be moved, without moving at the ſame time a great number of others, ſome of which will be diſtant from it; and the motion thus communicated to a maſs of the fluid will not be in any one determined direction, but will in each particle be different, according to the different manners in which it lies in contact with thoſe, from which it receives its impulſe; whence, great numbers of the particles, being diverted into oblique directions, the reſiſtance of the moving body, which will depend on the quantity of motion communicated to the fluid in its own direction, will be hereby different in quantity, from what it would be in the preceding ſuppoſition, and its eſtimation becomes much more complicated and operoſe. Sir Iſaac Newton, however, has determined, that the reſiſtance to a cylinder, moving in the direction of its axis in ſuch a compreſſed fluid as we have here treated of, is but one fourth part of the reſiſtance, which the ſame cylinder would undergo, if it moved with the ſame velocity, in a fluid, conſtituted in the manner we have deſcribed in our firſt hypotheſis, each fluid being ſuppoſed to be of the ſame denſity.

But again, it is not only in the quantity of their reſiſtance that theſe fluids differ, but

but likewiſe in the different manner in which they act on ſolids of different forms moving in them.

We have ſhewn, that in the diſcontinued fluid, which we firſt deſcribed, the obliquity of the foremoſt ſurface of the moving body would diminiſh the reſiſtance; but in compreſſed fluids this holds not true, at leaſt not in any conſiderable degree; for the principal reſiſtance in compreſſed fluids ariſes from the greater or leſſer facility, with which the fluid, impelled by the forepart of the body, can circulate towards its hindermoſt part; and this being little, if at all, affected by the form of the moving body, whether it be cylindrical, conical, or ſpherical, it follows, that while the tranſverſe ſection of the body, and conſequently the quantity of impelled fluid is the ſame, the change of figure in the body will ſcarcely affect the quantity of its reſiſtance.

The reſiſtance of bodies of different figures, moving in one and the ſame medium, has been conſidered by Mr. J. Bernouli in the Acta Lipſienſ. for May, 1693; and the rules he lays down, on this ſubject, are the following: 1. If an iſoſceles triangle be moved in the fluid according to the direction of a line which is normal to its baſe; firſt with the vertex foremoſt, and then with its baſe; the reſiſtances will be as the legs, and as the ſquare of the baſe, and as the ſum of the legs. 2. The reſiſtance of a ſquare moved according to the direction of its ſide, and of its diagonal, is as the diagonal to the ſide. 3. The reſiſtance of a circular ſegment (leſs than a ſemi-circle) carried in a direction perpendicular to its baſis, when it goes with the baſe foremoſt, and when with its vertex foremoſt (the ſame direction and celerity continuing, which is all along ſuppoſed) is as the ſquare of the diameter to the ſame, leſs one-third of the ſquare of the baſe of the ſegment. Cor. Hence the reſiſtances of a ſemi-circle, when its baſe, and when its vertex go foremoſt, are to one another in a ſeſquialterate ratio. 4. A parabola moving in the direction of its axis, with its baſis, and then its vertex foremoſt, has its reſiſtances, as the tangent to an arch of a circle, whoſe diameter is equal to the parameter, and the tangent equal to half the baſis of the parabola. 5. The reſiſtances of an hyperbola, or the ſemi-ellipſis, when the baſe and when the vertex goe foremoſt, may be thus computed; let it be, as the ſum, or difference, of the tranſverſe axis, and latus rectum, is to the tranſverſe axis, ſo is the ſquareof the latus rectum to the ſquare of the diameter of a certain circle; in which circle apply a tangent equal to half the baſis of the hyperbola or ellipſis. Then ſay again, as the ſum, or difference, of the axis and parameter is to the parameter, ſo is the aforeſaid tangent to another right line. And further, as the ſum, or difference, of the axis and parameter is to the axis, ſo is the circular arch, correſponding to the aforeſaid tangent, to another arch. This done, the reſiſtances will be as the tangent to the ſum, or difference, of the right line thus found, and that arch laſt mentioned. 6. In general, the reſiſtances of any figure whatſoever going now with its baſe foremoſt, and then with its vertex, are as the figures of the baſis to the ſum of all the cubes of the element of the baſis divided by the ſquares of the element of the curve line.

All which rules, he thinks, may be of uſe in the fabric or conſtruction of ſhips, and in perfecting the art of navigation univerſally. As alſo for determining the figures of the balls of pendulums for clocks. See the article SHIP, &c.

As to the reſiſtance of the air, Mr. Robins, in his new principles of gunnery, took the following method to determine it: he charged a muſket-barrel three times ſucceſſively with a leaden ball $\frac{3}{4}$ of an inch diameter, and took ſuch precaution in weighing of the powder, and placing it, as to be ſure, by many previous trials, that the velocity of the ball could not differ by 20 feet in 1″ from its medium quantity. He then fired it againſt a pendulum, placed at 25, 75, and 125 feet diſtance, &c. from the mouth of the piece reſpectively. In the firſt caſe it impunged againſt the pendulem with a velocity of 1670 feet in 1″; in the ſecond caſe with a velocity of 1550 feet in 1″; and in the third caſe with a velocity of 1425 feet in 1″; ſo that in paſſing through 50 feet of air, the bullet loſt a velocity of about 120, or 125 feet in 1″; and the time of its paſſing through that ſpace being about $\frac{1}{3\frac{1}{2}}$ or $\frac{1}{3\frac{1}{3}}$ of 1″, the medium quantity of reſiſtance muſt, in theſe inſtances, have been about 120 times the weight of the ball; which, as the ball was nearly $\frac{1}{2\frac{1}{2}}$ of a pound, amounts to about 10 lb. avoirdupoiſe.

Now

Now if a computation be made, according to the method laid down for compreſſed fluids in the 38th Propoſ. of lib. 2. of Sir Iſaac Newton's Principia, ſuppoſing the weight of water to be to the weight of air, as 850 to 1, it will be found that the reſiſtance of a globe of three quarters of an inch diameter, moving with a velocity of about 1600 feet in 1″, will not, on thoſe principles, amount to any more than a force of $4\frac{1}{6}$ lb. avoirdupoiſe; whence we may conclude (as the rules in that propoſition for ſlow motions are very accurate) that the reſiſting power of the air in ſlow motions is leſs than in ſwift motions, in the ratio of $4\frac{1}{6}$ to 10, a proportion between that of 1 to 2, and 1 to 3.

Again, charging the ſame piece with equal quantities of powder, and balls of the ſame weight, and firing three times at the pendulum, placed at 25 feet diſtance from the mouth of the piece, the medium of the velocities with which the ball impinged was 1690 feet in 1″. Then removing the piece 175 feet from the pendulum, the velocity of the ball, at a medium of five ſhots, was 1300 feet in 1″. Whence the ball, in paſſing through 150 feet of air, loſt a velocity of about 390 feet in 1″; and the reſiſtance, computed from theſe numbers, comes out ſomething more than in the preceding inſtance, amounting to between 11 and 12 pounds avoirdupoiſe: whence, according to theſe experiments, the reſiſting power of the air to ſwift motions is greater than in ſlow ones, in a ratio which approaches nearer to the ratio of 3 to 1, than in the preceding experiments.

Having thus aſcertained the reſiſtance to a velocity of near 1700 feet in 1″, he next proceeded to examine this reſiſtance in ſmaller velocities: the pendulum being placed at 25 feet diſtance, was fired at five times, and the mean velocity with which the ball impinged was 1180 feet in 1″. Then removing the pendulum to the diſtance of 250 feet, the medium velocity of five ſhot at this diſtance, was 950 feet in 1″; whence the ball, in paſſing through 225 feet of air, loſt a velocity of 230 feet in 1″, and as it paſſed through that interval in about $\frac{3}{4}$ of 1″, the reſiſtance to the middle velocity will come out to be near $33\frac{1}{2}$ times the gravity of the ball, or 2 lb. 10 oz. avoirdupoiſe. Now the reſiſtance to the ſame velocity, according to the laws obſerved in ſlower motions, amounts to $\frac{7}{11}$ of the ſame quantity; whence in a velocity of 1065 feet in 1″, (the medium of 1180 and 950) the reſiſting power of the air is augmented in no greater proportion than of 11 to 7; whereas in greater degrees of velocity, as before, it amounted very near to the ratio of 3 to 1.

That this reſiſting power of the air to ſwift motions, is very ſenſibly increaſed beyond what Sir Iſaac's theory for ſlow motions makes it, ſeems hence to be evident. It being, as has been ſaid, in muſket, or cannon ſhot, with their full charge of powder, near three times the quantity aſſigned by that theory.

The reſiſtance of a bullet of three quarters of an inch diameter, moving in air with a velocity of 1670 feet in 1″, amounting, as we ſaid, to 10 lb. the reſiſtance of a cannon ball of 24 lb. fired with its full charge of powder, and thereby moving with a velocity of 1650 feet in 1″, may hence be determined. For the velocity of the cannon ball being near the ſame as the muſket bullet, and its ſurface above 54 times greater, it follows, that the reſiſtance on the cannon ball will amount to more than 540 lb. which is near 23 times its own weight. And from hence it appears how raſh and erroneous the opinion of thoſe is, who neglect the conſideration of the reſiſtance of the air as of no importance in the doctrine of projectiles. See the articles PROJECTILE and GUNNERY.

RESISTANCE of the fibres of ſolid bodies is more properly called coheſion. See the article COHESION.

Solid of leaſt RESISTANCE. See SOLID.

RESOLUTION, in chemiſtry, *&c.* the reduction of a mixed body into its component parts, or firſt principles, by a proper analyſis. See the articles MENSTRUUM and SOLUTION.

The reſolution of bodies is effected by divers operations, as diſtillation, ſublimation, fermentation, precipitation, *&c.* See the articles DISTILLATION, SUBLIMATION, *&c.*

Some logicians uſe the term reſolution for what is more uſually called analyſis, or the analytic method. See the articles ANALYSIS and METHOD.

RESOLUTION, in medicine, that coction or alteration of the crude peccant matter of any diſeaſe, either by the natural ſtrength of the patient, or of its own accord, or by the application of remedies, whereby its bulk, figure, coheſion,

heſion, &c. are ſo far changed, as that it ceaſes to be morbid, and becomes laudable. This, Boerhaave obſerves, is of all others the moſt perfect cure, where it is effected without any evacuation, as ſuppoſing the matter favourable, the conſtitution excellent, and the medicines good.

RESOLUTION, in muſic, is when a canon or perpetual fugue is not wrote on a line, or in one part, but all the voices that are to follow the guide or firſt voice are wrote ſeparately either in ſcore, that is in ſeparate lines, or in ſeparate parts, with the pauſes each is to obſerve, and in the proper tone to each.

RESOLVENTS, *reſolventia*, in medicine, remedies proper to reſolve and diſſipate tumors and gatherings, to ſoften indurations, and, by their tenuity and warmth, evacuate redundant or peccant humours through the pores. Under this claſs come various unguents, emplaſters, &c.

RESONANCE, RESOUNDING, in muſic, &c. a ſound returned by the air, incloſed in the bodies of ſtringed muſical inſtruments, as lutes, &c. or even in the bodies of wind inſtruments, as flutes, &c. See SOUND and MUSIC.

Elliptic and parabolic vaults, reſound ſtrongly, that is, they will reflect or return a ſound. The mouth and the parts thereof, as the palate, tongue, teeth, noſe, and lips, Monſieur Dodart obſerves, contribute nothing to the tone of the voice, but their effect is very great as to the reſonance of this we have a very ſenſible inſtance in that vulgar inſtrument called a jews-harp, or trompe de Bearn; for if you hold it in your hand, and ſtrike the tongue or ſpring thereof, which is the method practiſed to ſound this inſtrument, it yields ſcarce any noiſe, but holding the body of it between the teeth, and ſtriking it as before, it makes a muſical buzz, which is heard at a good diſtance, and eſpecially the lower notes.

So alſo in the haut-boys, the tune of the reed is always the ſame; being a ſort of drone, the chief variety whereof is in the tune of reſonance produced in the mouth, by the greater or leſs aperture, and the various motions of the lips.

RESORT, or RESSORT. See RESSORT.

RESPECTU COMPUTI VICECOMITIS HABENDO, in law, a writ directed to the treaſurer and barons of the exchequer for the reſpiting of a ſheriff's account.

RESPIRATION, *reſpiratio*, the act of reſpiring, or breathing the air. What reſpiration is, and why it is uninterruptedly carried on without the concurrence of the mind, will appear from the following conſiderations of Boerhaave. The lungs ſuſpended in the air, which every where acts upon them, and equally preſſes them always, collapſe, contract themſelves into a ſmaller ſpace, and become much leſs than when they remained in the intire thorax. This is principally performed by the contractile force of the muſcular fibres, which connect the ſquamous ſegments of the bronchia. If the lungs thus contracted, are filled with air, forcibly blown through the glottis, they are ſo diſtended as in bulk not only to equal that which they had in the intire thorax, but even to exceed it; all which is ſufficiently certain from experiments. The ſame thing happens if, when an acceſs for the air through the glottis is left to the lungs, the air externally acting on the lungs, is either removed, or its preſſure diminiſhed. Hence it is obvious, that the lungs, by their proper force have always a tendency to become leſs in all their parts than they are when placed in the intire thorax. For this reaſon, it is certain that they are in a continual ſtate of diſtraction ſo long as a perſon is alive, ſo that they muſt collapſe, and be diminiſhed, whilſt the whole of the animal remains in a vacuum, obtained by an exhauſtion of the air in an air-pump. For there is nothing ſimilar to a circumambient air between the external membrane of the lungs, and all the internal ſurface of the pleura in a ſound perſon; nothing therefore externally compreſſes the lungs, except the diaphragm. There is, however, always an internal air contained in them, and freely conveyed to them through the glottis. Hence the lungs are always ſomewhat more diſtended by the internal, than they are compreſſed by the external, air, the acceſs of which is hindered by the diaphragm, which is ſo connected with the ribs and vertebræ, that the air cannot enter the thorax in ſuch a manner as would be requiſite for an equilibrium. See the article LUNGS, DIAPHRAGM, &c.

Since, therefore, in inſpiration, a greater quantity of air enters the lungs through the glottis, it will extend the lungs more, and overcome their natural force, ſo that in this action the lungs are paſſive; but how far they are active is only to be diſcovered from certain phænomena. In vital inſpiration, then, eſpecially conſidered in a ſleeping perſon, firſt the ribs, particularly the nine ſuperior ones, articulated at the vertebræ, and by cartilages joined to the ſternum, with their arched part, riſe to the clavicles, ſo that this motion is principally obſerved in the middle of the arch, whilſt three, or perhaps four, inferior ribs are turned downwards, backwards, and obliquely outwards, but in ſuch a manner that the ſeventh, eighth, ninth, and tenth ribs are by their cartilaginous ſegments, as it were, drawn inwards. Secondly, the whole abdomen, to the very end of inſpiration, is gradually rendered more tumid and preſſed downwards. Thirdly, at the ſame time the cavity of the thorax is enlarged, as is obvious from repeated experiments.

Whilſt the parts remain in this ſituation, the air acts upon the lungs with a force equal to that with which the thorax reſiſts, ſo that the lungs will remain in a ſtate of reſt. Hence leſs blood will paſs through them, and a ſmaller quantity of it will be forced into the left ventricle of the heart, and conſequently leſs blood will be conveyed to the cerebellum and its nerves. The arterial blood will alſo act leſs upon the intercoſtal muſcles and diaphragm, ſo that the cauſes dilating the thorax are weakened. Hence the elaſticity of the cartilaginous ſegments again depreſſes the ribs, in which work they are alſo aſſiſted by the muſcular fibres ariſing from the ſide of the ſternum within the thorax, and inſerted into the bony extremities, and cartilages of the true ribs. At the ſame time the diſtracted fibres of the peritonæum and abdominal muſcles reſtore themſelves. Hence the compreſſed viſcera thruſt the relaxed diaphragm upwards into the thorax, which is by this means contracted, and the air expelled from the lungs. By this means, expiration and the action already mentioned, are performed. But in a particular manner by theſe two actions the blood is not only carried through the lungs, but its motion accelerated. See CIRCULATION, &c.

Phyſicians are not agreed about the uſe and effects of reſpiration; ſome think that the air is inſinuated into the veſſels of the lungs, to give a greater fluidity and motion to the blood; others, that it conveys very ſubtile nitrous corpuſcles thereunto, which gives it the red colour; others again, believe the air ſerves to condenſe the blood, which has been heated by circulation. This is certain, that the air entering into the lungs, and all the ſmall ramifications which ſurround its veſicles is broke, comminuted, and rendered more fluid, and that it is deprived of a ſeroſity, which proceeds from the lungs by perſpiration in the form of a vapour that is viſible in cold weather. It may be added, that the voice, laughter, coughing, ſneezing, yawning, and ſucking, depend upon reſpiration. Boerhaave takes the principal uſes of reſpiration to be the further preparation of the chyle, its more accurate mixture with the blood, and its converſion into a nutritious juice, proper to repair the decays of the body. Other authors take a great uſe of reſpiration to be, by the neighbourhood of the cold nitrous air, to cool the blood coming reeking hot out of the right ventricle of the heart through the lungs, and to act as a refrigeratory; others aſſert one grand uſe of reſpiration to be the throwing off the ſuliginous vapours of the blood, along with the expelled air; and for inſpiration they aſſert, that it conveys a nitro-aerial ferment to the blood, to which the animal ſpirits, and all muſcular motion, are owing. But Dr. Thurſton rejects all theſe, as being the principal uſes of reſpiration, and from the experiments of Dr. Croon, Dr. Hook, and others, made before the Royal Society, he ſhews the principal uſe of reſpiration to be that of moving, or paſſing the blood from the right to the left ventricle of the heart, and ſo to effect circulation; whence it is, that perſons hanged, drowned, or ſtrangled, ſo ſuddenly die, *viz.* becauſe the circulation of the blood is ſtopped, and for the ſame reaſon it is, that animals die ſo ſpeedily in the air-pump. This uſe of reſpiration Dr. Drake not only confirms, but carries farther, making it the true cauſe of the diaſtole of the heart, which neither Borelli, Dr. Lower, nor Mr. Cowper, had well accounted for. See the articles DIASTOLE and SYSTOLE.

From

From experiments made upon dogs, and other animals, Dr. Hales ſhews, that without reſpiration, the blood would ſoon turn putrid and peſtilential; and indeed the only animal exempted from the neceſſity of reſpiration is a foetus. See FOETUS.

With regard to the force of reſpiration, the laſt mentioned author obſerves, that though a man by a peculiar action of his mouth and tongue, may ſuck mercury twenty-two inches, and ſome men twenty-ſeven or twenty-eight, high, yet he found from experience, that by the bare inſpiring action of the diaphragm and dilating thorax, he himſelf could ſcarcely raiſe the mercury two inches, at which time the diaphragm muſt act with a force equal to the weight of a cylinder of mercury, whoſe baſe is commenſurate to the area of the diaphragm, and its height two inches, whereby the diaphragm muſt at the ſame time ſuſtain a weight equal to many pounds; neither are its counteracting muſcles, thoſe of the abdomen, able to exert a greater force.

With regard to the quantity of moiſture carried off by reſpiration, the Dr. from an experiment on wood-aſhes, eſtimates that quantity to be equal to ſeventeen grains in fifty expirations, whence there will proportionably be four hundred and eight grains evaporated or breathed off in twelve hundred expirations, being the number in an hour, and thence in twenty-four hours 9792 grains, or 1.39 pounds, which ſuppoſing the ſurface of the lungs to be 41635 ſquare inches, then the quantity evaporated from that inward ſurface will be $\frac{1}{1074}$th part of an inch depth.

From the violent and fatal effects of very noxious vapours on the reſpiration and life of animals, the Dr. ſhews how the reſpiration is proportionably incommoded when the air is loaded with leſſer degrees of vapours, which vapours do in ſome meaſure clog and lower the air's elaſticity, which it beſt regains by having theſe vapours diſpelled by the ventilating motion of the free open air, that is beſt rendered wholeſome by the agitation of winds; thus what we call a cloſe warm air, ſuch as has been long confined in a room, without having the vapours in it carried off by communicating with the open air, is apt to give us more or leſs uneaſineſs in proportion to the quantity of vapours which are floating in it. And thus many of thoſe who have weak lungs, but can breathe very well in the freſh country air, are greatly incommoded in their breathing, when they come into large cities where the air is full of fuligenous vapours; and even the moſt robuſt and healthy, in changing from a city to a country air, find an exhilerating pleaſure ariſing from a more free and kindly inſpiration, whereby the lungs being leſs loaded with condenſing air and vapours, and thereby the veſicles more dilated with a clearer and more elaſtic air, a freer courſe is thereby given to the blood, and probably a purer air mixed with it. See the article AIR.

RESPITE, in law, *&c.* ſignifies a delay, forbearance, or prolongation of time, granted any one, for the payment of a debt, or the like.

RESPONDENT SUPERIOR, in law, is a ſuperior's anſwering for the inſufficiency of an inferior. Thus, if the ſheriffs of London are inſufficient, the lord-mayor and commonalty muſt anſwer for them, as the ſheriffs ſuperior.

Superior officers muſt alſo anſwer for their deputies, in civil actions, in caſe they are inſufficient to anſwer damages; as where a gaoler deputes another under him, and the perſon deputed ſuffers an eſcape, the gaoler muſt anſwer for his deputy's inſufficiency.

RESPONDENT, in the ſchools, one who maintains a theſis, in any art or ſcience; who is thus called, from his being to anſwer all the objections propoſed by the opponent.

The reſpondent is to ſee whether the poſition made by the contrary party be juſt and legitimate; or whether ſome of the laws of oppoſition be not broken. He is alſo to manage the modes and figures of the ſyllogiſms, to ſee whether the premiſes be juſt; and through the whole, to anſwer rather by diſtinguos, than by direct negation.

RESPONDENT, in law, a perſon who undertakes to anſwer for another; and alſo, one who binds himſelf as a ſecurity for another perſon's good behaviour.

RESPONSALIS, in law, is a perſon who anſwers for another, in court, at a day aſſigned.

RESPONSARY SONG, an anthem, in which the choriſters ſing by turns.

RESPONSE, an anſwer or reply. A word chiefly uſed in ſpeaking of the anſwers

made by the people to the prieſt, in the litany, the pſalms, *&c.*

RESSAULT, in architecture, is the effect of a body which either projects or ſinks back; that is, ſtands more out or in, than another, ſo as to be out of the line or level with it.

RESSORT, or RESORT, a french word, ſometimes uſed by engliſh authors, to ſignify the juriſdiction of a court, and particularly one from which there is no appeal.

Thus it is ſaid, that the houſe of lords judge en dernier reſſort, or in the laſt reſſort.

RESSOURCE, a french word, uſed by engliſh writers, to denote an after-game, for recovering a perſon's loſſes, or ſomething to apply back to, for ſuccour.

REST, *quies*, the continuance of a body in the ſame place, or its continual application or contiguity to the ſame parts of the ambient or contiguous bodies; and, therefore, is oppoſed to motion. See the article MOTION.

Sir Iſaac Newton defines true or abſolute reſt, to be the continuance of a body in the ſame part of abſolute ſpace; and relative reſt to be the continuance of a body in the ſame part of relative ſpace. See the article SPACE.

It is one of the laws of nature, that matter is indifferent to motion or reſt, as has been ſhewn under the article INERTIA.

Reſt, conſidered in a phyſical view, is only ſalutary, in ſo far as it is duly proportioned to the exerciſe; for a ſedentary idle life brings on many indiſpoſitions. See the article EXERCISE.

REST, in poetry, is a ſhort pauſe of the voice, in reading, being the ſame with with the cæſura, which, in alexandrine verſes, falls on the ſixth ſyllable; but in verſes of ten or eleven ſyllables, on the fourth. See CÆSURA, ALEXANDRINE, *&c.*

REST, in muſic, the ſame with pauſe. See the article PAUSE.

RESTAURATION, the act of re-eſtabliſhing or ſettling a thing in its former good ſtate.

RESTAURATION, in architecture, the act of repairing thoſe parts of a building that are gone to decay, in ſuch a manner as to give it its original ſtrength and beauty.

From the plinths of the corinthian columns of the Pantheon, which are almoſt wholly under-ground, it is evident that the pavement of this temple is only a reſtauration made in the time of Septimus Severus.

RESTAURATION, in ſculpture, is the repairing a mutilated ſtatue, *&c.*

Many of the antique ſtatues have undergone a reſtauration; as the wreſtlers, in the gallery of the great duke of Florence; the farneſe Hercules; the Faunus in the villa Borgheſe, at Rome; and the Venus of Arles, in the gallery at Verſailles: but theſe reſtaurations have all been made by the ableſt ſculptors.

RESTINCTION, in chemiſtry, is the quenching a metal or mineral, in ſome liquor, in order either to correct or exalt it, by giving it ſome new power or quality.

RESTITUTION, in phyſics, is reſtoring an elaſtic body, forcibly bent, to its natural ſtate. See the article ELASTICITY.

RESTITUTION, in a moral and legal ſenſe, is reſtoring a perſon to his right; or returning ſomething unjuſtly taken or detained from him.

In the romiſh church, uſurers, *&c.* are obliged to a reſtitution of their ill-gotten goods; otherwiſe the prieſt has no authority to give them abſolution.

RESTITUTION IN INTEGRUM, the ſame with reſciſſion. See RESCISSION.

RESTITUTION *of medals*, or RESTITUTED MEDALS, is a term uſed by antiquaries, for ſuch medals as were ſtruck by the emperors, to retrieve the memory of their predeceſſors.

Hence, in ſeveral medals we find the letters REST. This practice was firſt begun by Claudius, by his ſtriking afreſh ſeveral medals of Auguſtus. Nero did the ſame; and Titus, after his father's example, ſtruck reſtitutions of moſt of his predeceſſors. Gallienus ſtruck a general reſtitution of all the preceding emperors, on two medals, the one bearing an altar, the other an eagle, without the REST. See the article MEDAL.

RESTITUTIONE TEMPORALIUM, is a writ that lies when a man is elected and confirmed biſhop of a dioceſe, for the recovery of the temporalities of the biſhopric.

This writ is directed from the king to the eſcheator, or rather ſheriff of the county.

RESTIVE, or RESTY, in the manege, a ſtubborn, unruly, ill-broken horſe, that ſtops, or runs back, inſtead of advancing forward.

RESTORATION, the ſame with reſtauration. See RESTAURATION.

In England, the return of king Charles II. in 1660, is, by way of eminence, called the Reſtoration; and the 29th of May is kept as an anniverſary feſtival, in commemoration of that event, by which the regal and epiſcopal government was reſtored.

RESTORATIVE, in medicine, a remedy proper for reſtoring and retrieving the ſtrength and vigour both of the body and animal ſpirits.

All under this claſs, ſays Quincy, are rather nutrimental than medicinal; and are more adminiſtered to repair the waſtes of the conſtitution, than to alter and rectify its diſorders. Whatſoever can anſwer this end, muſt be both endued with a diſpoſition to enter into, and mix with, the moſt ſubtile of the animal fluids, and to fall into and adhere with ſuch interſtices of the ſolids, as have been wore away by action, and ſtand in need of recruit. Theſe are one of the claſſes of balſamics, and are diſtinguiſhed by the term analeptics. See the articles ANALEPTICS, BALSAMICS, &c.

Some of the principal medicines of this intention are the leaves of white and black maiden-hair, eruca, colts-foot, piſtachio-nuts, ſcabious, balſam of Tolu, bdellium, benzoin, eryngo, ſtorax, barley, &c. Hoffman obſerves, that a true and genuine reſtoration of the natural ſtrength depends upon proper aliments, both of the eatable and drinkable kind, being converted into good blood, and laudable juices, which afterwards generate that ſubtil fluid which is ſecreted in the brain; and being carried through the nerves to the muſcles and muſcular coats, principally ſupplies the body, and its ſeveral parts, with ſtrength and vigour. Thoſe nutritives, therefore, which afford a matter moſt proper for this purpoſe, are the beſt analeptics; of which kind are glutinous broths of fleſh, capons, and bones with their marrow, boiled in a cloſe veſſel, with water, a little wine, ſome ſlices of lemon, a little ſalt, powder of mace and cloves; broths alſo made of coarſe weſtphalian bread, water, wine, and eggs; chocolate, with or without milk, aſſes milk, &c. But thoſe nutritive and ſtrengthening aliments, he adds, are not to be uſed in the very time of the diſeaſe, nor when the whole maſs of blood and humours are impure; but when the diſtemper is over, and where, by a preceding diſeaſe, or by long watching, fatigue, and labour of body, or large hæmorrhages, the ſtrength is waſted and impaired: but even then a proper moderation is to be obſerved and kept up to, becauſe theſe aliments paſs very ſpeedily into the blood, and augment its quantity.

RESTRICTION, among logicians, is limiting a term, ſo as to make it ſignify leſs than it uſually does.

RESTRINGENT, in medicine, the ſame with aſtringent. See ASTRINGENT.

RESULT, what is gathered from a conference, inquiry, meditation, or the like; or the concluſion and effect thereof.

RESUMMONS, in law, is the ſecond ſummons or calling a perſon to anſwer an action, where the firſt ſummons is defeated by any accident, as the death of a party, or the like.

RESUMPTION, a word uſed in various ſenſes: thus, in law, it ſignifies the king's taking again into his own hands, ſuch lands, &c. as he had before, on falſe ſuggeſtions, granted to a perſon by letters patent.

In the ſchools, reſumption ſignifies a ſummary repetition of an argument, in order to confute it.

The ſame word is alſo uſed by logicians for the reduction either of ſome figurative or quaint propoſition, to one more plain or intelligible; as, the meadows ſmile; that is, look pleaſant.

RESURRECTION, in theology, riſing again from the dead; or a perſon's returning to a ſecond life, with new bodily organs, adapted to the ſtate of its new exiſtence.

One of the greateſt arguments for the truth of chriſtianity is drawn from the reſurrection of our Saviour; the circumſtances of which are handed down to us in ſo plain and diſtinct a manner, by the evangeliſts, as make the evidence of this important truth amount to a demonſtration.

Chriſtians generally believe, that at the day of judgment, the very identical body they have now, with the ſame fleſh, blood, and bones, will be raiſed from the dead. But, in oppoſition to this opinion, many texts of ſcripture have been urged, particularly the account given of this important event by St. Paul; beſides ſeveral philoſophical objections, the principal of which are theſe.

That

That the ſame ſubſtance may happen to be a part of two or more bodies: thus a fiſh feeding on a man, and another man afterwards feeding on the fiſh, part of the body of the firſt man becomes incorporated with the fiſh, and afterwards with the body of the laſt man. Again, inſtances have been known of one man's immediately feeding on the body of another; and among the cannibals in the Weſt-indies, who devour their enemies, the practice is frequent. Now it is alledged, where the ſubſtance of one is thus converted into the ſubſtance of another, each cannot ariſe with his whole body; to which then ſhall the common part be alloted?

To this objection ſome anſwer, that as all matter is not capable of being aſſimilated to the body, and incorporated with it, human fleſh may very probably be of this kind; and, therefore, what is thus eaten, may be again excreted and carried off.

But Mr. Leibnitz obſerves, that all that is eſſential to the body, is the original ſtamen, which exiſted in the ſemen of the father: this may be conceived as the moſt minute point imaginable, and therefore not to be ſeparated, nor any part of it united to the ſtamen of any other man. That all this bulk we ſee in the body, is only an accretion to this original ſtamen; and therefore there is no reciprocation of the proper matter of the human body.

Another objection is, that we know, by the late diſcoveries in the animal œconomy, that the human body is continually changing, and that a man has not entirely the ſame body to-day, as he had yeſterday; and it is even computed that in leſs than ſeven years time, the whole body undergoes a change. Which of thoſe many bodies then, which the ſame perſon has in the courſe of his life, is it that ſhall riſe? or does all the matter that has ever belonged to him, riſe again? or does only ſome particular ſyſtem thereof? the body, for example, he had at twenty, at forty, or at ſixty years old? If only this or that body ariſe, how ſhall it be rewarded or puniſhed for what was done by the other? and with what juſtice does one perſon ſuffer for another?

To this it has been anſwered, on the principles of Leibnitz, that notwithſtanding theſe ſucceſſive changes, this ſtamen, which is the only eſſential part of the body, has always remained the ſame; and that on Mr. Locke's principles, perſonal identity, or the ſameneſs of a rational being, conſiſts in ſelf-conſciouſneſs, in the power of conſidering itſelf the ſame thing in different times and places. By this, every one is to himſelf what he calls ſelf; without conſidering whether that ſelf be continued in the ſame, or in ſeveral ſubſtances. It is the ſame ſelf now, it was then; and it was by the ſame ſelf which now reflects on an action, that action was performed. Now it is this perſonal identity that is the object of rewards and puniſhments, which, it is obſerved may exiſt in different ſucceſſions of matter; ſo that to render the rewards and puniſhments juſt and pertinent, we need only to riſe again with ſuch a body as that we retain the conſciouſneſs of our paſt actions.

RESUSCITATION, the ſame with reſurrection and revivification. See the preceding article, and REVIVIFICATION. The term reſuſcitation, however, is more particularly uſed by chemiſts, for the reproducing a mixed body from its aſhes; an art to which many have pretended, as to reproduce plants, &c. from their aſhes.

RETAIL, in commerce, is the ſelling of goods in ſmall parcels, in oppoſition to wholeſale. See the article COMMERCE.

RETAINER, in law, a ſervant who does not continually dwell in the houſe of his maſter, but only attends upon ſpecial occaſions.

RETAINING FEE, the firſt fee given to a ſerjeant or counſellor at law, in order to make him ſure, and prevent his pleading on the contrary ſide. See FEE.

RETALIATION, among civilians, the act of returning like for like. See the article TALIONIS LEX.

RETARDATION, in phyſics, the act of diminiſhing the velocity of a moving body. See the article MOTION.

If bodies of equal bulk, but of different denſities, be moved through the ſame reſiſting medium, with equal velocity, the medium will act equally on each, ſo that they will have equal reſiſtances, but their motions will be unequally retarded, in proportion to their denſities. See the article RESISTANCE.

Retarded motion from gravity, is peculiar to bodies projected upwards, and this in the ſame manner as a falling body is accelerated; only in the latter, the force of gravity acts in the ſame direction with the motion of the body; and in the former

mer in an oppoſite direction. See the article ACCELERATION.

As it is the ſame force which augments the motion in the falling, and diminiſhes it in the riſing body, a body will riſe till it has loſt all its motion; which it does in the ſame time wherein a body falling would have acquired a velocity equal to that wherewith the body was projected upwards.

RETE MIRABILE, in anatomy, a ſmall plexus, or net-work of veſſels in the brain, ſurrounding the pituitary gland.

The rete mirabile is very conſpicuous in brutes, but either not exiſtent in man, or ſo very minute that is exiſtence is fairly doubted. See the article BRAIN.

RETENTION, is defined, by Mr. Locke, to be a faculty of the mind, whereby it keeps, or retains, thoſe ſimple ideas it has once received, by ſenſation or reflection.

This is done two ways; firſt, by keeping the idea which is brought into the mind for ſome time in view; this is called contemplation. See the article CONTEMPLATION.

Secondly, by reviving thoſe ideas in our minds which have diſappeared, and have been as it were laid out of ſight; this is memory, which is as it were the repoſitory of our ideas. See the article MEMORY.

RETENTION is alſo uſed, in medicine, *&c.* for the ſtate of contraction in the ſolids or vaſcular parts of the body, which makes them hold faſt their proper contents. In this ſenſe retention is oppoſed to evacuation and excretion. See EVACUATION and EXCRETION.

Retention and excretion make two of the non-naturals.

Retention is alſo frequently conſidered as a diſorder, and defined to be the act of retaining the excrements, humours, *&c.* ſo as they cannot be voided out of the body. See COSTIVENESS.

For the retention of the urine, ſee the articles DYSURY, ISCHURY, and STRANGURY.

RETIARII, in antiquity, a kind of gladiators, thus denominated from a net which they made uſe of againſt their antagoniſts, who were called ſecutores, and ſometimes mirmillones. See the article GLADIATOR.

This net they carried under their buckler, and when opportunity ſerved, caſt it over the head of their antagoniſt, and in this condition killed him with a trident which they bore in the other hand.

RETICENCY, *reticentia*, a figure in rhetoric whereby we make oblique mention of a thing, in pretending to paſs it over unmentioned.

RETFORD, a borough-town of Nottinghamſhire, ſituated twenty-five miles north of Nottingham.

It ſends two members to parliament.

RETICULA, or RETICULE, in aſtronomy, a contrivance for the exact meaſuring the quantity of eclipſes.

The reticule is a little frame, conſiſting of thirteen fine ſilken threads, equidiſtant from each other, and parallel, placed in the focus of object-glaſſes of teleſcopes; that is, in the place where the image of the luminary is painted in its full extent: of conſequence, therefore, the diameter of the ſun or moon is hereby ſeen divided into twelve equal parts or digits; ſo that to find the quantity of the eclipſe, there is nothing to do but to number the luminous and the dark parts. As a ſquare reticule is only proper for the diameter, not for the circumference, of the luminary, it is ſometimes made circular by drawing ſix concentric equi-diſtant circles. This repreſents the phaſes of the eclipſe perfectly.

RETICULAR BODY, *corpus reticulare*, in anatomy, a very fine membrane, perforated, in the manner of a net, with a multitude of foramina. It is placed immediately under the cuticle, and when that is ſeparated from the cutis, whether by art or by accident, this adheres firmly to it, and is ſcarce poſſible to be parted from it, ſeeming rather to be its inner ſuperficies than a diſtinct ſubſtance. In regard to this, we are to obſerve, firſt, the places in which it is found, being all thoſe in which the ſenſe of feeling is moſt acute, as in the palms of the hands, the extremities of the fingers, and on the ſoles of the feet. The tongue, however, is the part where it is moſt accurately to be obſerved: it is more eaſily diſtinguiſhable there than any where elſe, and its nature and ſtructure are moſt evidently ſeen there.

Its colour in the Europeans is white, but in the Negroes, and other black nations, it is black; in the tawny it is yellowiſh; the ſkin itſelf in both is white; and the blackneſs and yellowneſs depend altogether on the colour of this membrane.

The uſes of the corpus reticulare are to preſerve the ſtructure of the other parts of the integuments, and keep them in their determinate form and ſituation. Its apertures give paſſage to the hairs, and let through the papillæ and excretory ducts of the ſkin: it retains theſe in a certain and determinate order, that they cannot be removed out of their places, and has ſome ſhare in preſerving the ſoftneſs of the papillæ, which renders them fit for the ſenſe of feeling. See the article CUTICLE and CUTIS.

RETICULAR PLEXUS, *plexus reticularis*, ſometimes denotes the choroides, which is thus called becauſe its fibres are interwoven like a net. See CHOROIDES.

RETICULUM, the caul or omentum, a name ſometimes given to this part, from its net-like ſtructure. See the article OMENTUM.

RETIFORMIS LACIS, in anatomy, the ſame with the rete mirabile. See the article RETE.

RETINA, in anatomy, the expanſion of the optic nerve on the internal ſurface of the eye, whereupon the images of objects being painted, are impreſſed, and by that means conveyed to the common ſenſory in the brain, where the mind views and contemplates their ideas. See the article EYE.

Diſeaſes of the RETINA. The retina is liable to two ſorts of diſeaſes; the firſt is a ſeparation of ſome parts of this membrane from the choroides. At the place where this ſeparation is made, there follows an elevation or fold which ſtops the light, and hinders its paſſage to that part of the choroides which is covered by this fold: this occaſions a ſort of ſhade which the patients ſee in the air. The ſecond diſeaſe of the retina is an atrophy, or waſting of that membrane.

The cauſe of the firſt diſeaſe may be accounted for, from the blood-veſſels of the retina's turning varicous; for it is eaſily conceived that the dilatation of theſe veſſels may ſeparate the retina from the choroides, in that part which anſwers to the dilated veſſels. This diſeaſe is obſerved to proceed from a cold in the head after ſome violent exerciſe, or whatever elſe may have put the blood into a violent motion. Its ſigns are certain appearances in the air, more or leſs diſtant from the patient's eye, being a kind of ſhadows of different figures, modified according to the ſize and form of the parts of the retina, which are ſeparated. A further account of this diſeaſe, and the manner of treating it, may be ſeen in *Atoms and flies appearing before the* EYES, under the article EYE.

In an atrophy of the retina, as the rays of light are not ſufficiently modified in that membrane, they make too vivid an impreſſion on the choroides, which is very detrimental to it. Hence enſues a confuſed viſion, ſo that the patients at the firſt look can ſee very well; but if they continue to read any time, or to look at a ſhining object, they feel a certain wearineſs in their head and a dimneſs in their ſight, which obliges them to cloſe their eyes; then opening them a moment after they ſee as at their firſt look, but for a very ſhort time.

Embroiderers, ſtocking-weavers, and ſhoe-makers, are ſubject to this diſeaſe; the firſt becauſe the brightneſs of the gold, ſilver, and other colours, damages the ſight by the lively impreſſion it makes on the eye; and the ſhoe-makers, in order to find the hole made by the awl, to run the end through it. By this continual attention, they fatigue and weaken their ſight. No remedies cure this diſeaſe; nothing avails but reſt, and little exerciſe of the ſight.

RETINUE, *retinentia*, the attendants or followers of a prince or perſon of quality, chiefly in a journey.

In law, theſe perſons are properly ſaid to be a nobleman's retinue, who belong to him in quality either of ſervants or retainers.

RETIRADE, in fortification, a kind of retrenchment made in the body of a baſtion, or other work, which is to be diſputed, inch by inch, after the defences are diſmantled. It uſually conſiſts of two faces, which make a re-entering angle. When a breach is made in a baſtion, the enemy may alſo make a retirade or new fortification behind it.

RETLINGEN, an imperial city of Germany, in the circle of Swabia and dutchy of Wirtemberg, ſituated in eaſt long. 9°, north lat. 48° 18'.

RETORT, in chemiſtry, a kind of hollow ſpherical veſſel, ABCDEF (plate CCXXXII. fig. 1. n° 1, 2, 3.) ending in a cylindrical neck, whoſe upper horizontal line, AF, is a tangent of the ſphere in its upper apex, A, whilſt the lower line of the neck, DE, is a diameter of the ſame ſphere, parallel to that tangent, whence ſuch a retort eaſily determines the riſing volatile particles into the

the cylindrical neck of the receiver, after being ſomewhat confined and beat back by the arched part of the veſſel. This kind of retort is adapted to the ſeparation of very fixed parts from thoſe that are quite fixed, as we ſee in the diſtillation of oil of vitriol, ſpirit of nitre, ſpirit of ſalt, *&c.* The glaſs-men commonly bend the neck of the retort downwards, and draw it into a conical figure, open at the ends, in order that the vapours riſing in the wideſt part of the neck may thus ſpontaneouſly fall downwards, condenſe, and diſtil into the receiver, which ſhews us the reaſon of the common form of the retort.

But in low diſtillations, where the ſtrongeſt fire is for a long time required to raiſe ponderous particles, Boerhaave recommends the uſe of a cylindrical veſſel, ABCD, n° 4. placed horizontally, with its upper horizontal part opening into an horizontal neck, by means whereof the diſtillation of phoſphorus, and other bodies which riſe with difficulty, is commodiouſly performed: and when he prepared large quantities of oil of vitriol, or other foſſile acids, inſtead of retorts he uſed cylindrical earthen bodies, or long necks, as ABCDEFGH, (*ibid.* n° 5.) with wide cylindrical mouths, which he found to be an advantageous way of diſtilling the mineral acids; for by inſerting hollow cylinders, as IKLM, (n° 6.) into the mouths of theſe veſſels, and applying large glaſs receivers, as ONPQ, n° 7. horizontally to the other ends, and luting the junctures, he thus diſtilled with ſafety.

RETRACTION, *retractio*, the act of drawing back, or unſaying what a perſon had ſaid before.

Among anatomiſts, retraction frequently ſignifies the contraction or ſhortening of any part.

RETRACTS, among horſemen, pricks in a horſe's feet, ariſing from the fault of the farrier in driving nails that are weak, or in driving them ill pointed, or otherwiſe amiſs. Theſe, unleſs timely prevented, feſter and prove very dangerous. When the farrier, in ſhoeing, perceives the horſe to ſhrink at every blow on the nail, it is the ſign of a retract, and the nail is to be pulled out again, which is done without any harm. When the horſe halts immediately after he is ſhod, it is concluded ſome of the nails preſs the veins, or touch him in the quick. To find where the grievance lies, they knock the nails round with a hammer, till the horſe, ſhrinking upon hitting a particular nail, diſcovers the place. Some farriers give this as a rule, that, throwing water on the hoof, the place where he is hurt will dry ſooner than any of the reſt. The places where the horſes are moſt uſually pricked, are the heel in the fore-foot, and the toe in the hind-foot.

RETRAHENS *auriculam*, in anatomy, a muſcle of the external ear, conſiſting of a parcel of fleſhy fibres, which in ſome bodies are divided into three diſtinct muſcles ariſing from the os temporale, and fixed to the hind part of the concha. But theſe muſcles are ſo ſmall in men, that the auricle is ſeldom moveable at all. See the article EAR.

RETRAXIT, in law, is where a plaintiff comes in perſon to the court where his action is brought, and declares he will not proceed in it, in which caſe the action is barred for ever.

A retraxit differs from a nonſuit in this, that it is always where the plaintiff or demandant is perſonally in court. See the article NONSUIT.

RETREAT, in war, the retiring or moving back again of any army or part thereof.

RETREAT, or RELAY, in maſonry, a little receſs or diminution of the thickneſs of a wall, rampart, *&c.* in proportion as it is raiſed. The retreat, properly, is the diminution of a wall without-ſide, or the contraction of its upper courſes more than the foundation. Where the foundation is very long, they uſually make two or three retreats.

RETRENCHMENT literally ſignifies ſomething cut off or taken from a thing; in which ſenſe it is the ſame with ſubtraction, diminution, *&c.*

RETRENCHMENT, in the art of war, any kind of work raiſed to cover a poſt, and fortify it againſt the enemy, ſuch as faſcines loaded with earth, gabions, barrels of earths, ſand-bags, and generally all things that can cover the men and ſtop the enemy. But retrenchment is more particularly applicable to a foſs bordered with a parapet; and a poſt fortified thus is called poſt retrenched, or ſtrong poſt. Retrenchments are either general or particular: general retrenchments are new fortifications made in a place beſieged, to cover the beſiegers when the enemy become maſters of a lodgment on the fortification, that they may be in a condition of diſputing the ground inch by

inch, and of putting a ſtop to the enemy's progreſs in expectation of relief. See the article RETIRADE.

Particular retrenchments are ſuch as are made in the baſtions when the enemy are maſters of the breach. Theſe can never be made but in new full baſtions, for in empty, or hollow ones, there can only be made retirades. The particular retrenchments are made ſeveral ways, according to the time they have to cover themſelves: ſometimes they are made before hand, which are certainly the beſt. The parapets of ſuch retrenchments ought to be five or ſix feet thick, and five feet high, with a large and deep foſs, from whence ought to run out ſmall fougades and countermines. See FOUGADE.

RETRIBUTION, *retributio*, a handſome preſent, gratuity, or acknowledgment, given inſtead of a formal ſalary, or hire, to perſons employed in affairs that do not ſo immediately fall under eſtimation, nor within the ordinary commerce in money.

RETRIEVE, to recover, get again, or repair a thing loſt or damaged.

To retrieve, in falconry, ſignifies to ſpring or find partridges again which have been once ſprung before.

RETROACTIVE, in law, that which has an influence or effect on time paſt.

RETROCESSION, *retroceſſio*, the act of going backwards; more uſually called retrogreſſion, or retrogradation. See the next article.

RETROCESSION *of the equinox*. See the article PRECESSION.

RETROGRADATION, or RETROGRESSION, the act or effect of a thing moving backwards.

The retrograde motion of the planets is an apparent motion, whereby they ſeem, to an obſerver placed on the earth, to move backwards, or contrary to the ſigns. See PLANET, ORBIT, *&c.*

As to the retrograde motion of the ſun, when in the torrid zone, and has his declination AM (plate CCXXXII. fig. 3.) greater than the latitude of the place AZ, but either northern or ſouthern as that is, the ſun will appear to go backwards, or to be retrograde both before and after noon.

For draw the vertical circle, ZGN, to be a tangent to the ſun's diurnal circle in G, and another, ZON, through the ſun riſing in O. It is evident all the intermediate vertical circles cut the ſun's diurnal circle twice; firſt, in the arch GO, and the ſecond time in the arch GI. Wherefore, as the ſun aſcends through the arch GO, it continually arrives at farther and farther verticals. But, as it continues its aſcent through the arch GI, it returns to its former verticals; and, therefore, is ſeen retrograde for ſome time before noon. The ſame, it may be ſhewn after the ſame manner, it does for ſome time after noon.

The retrograde motion of the nodes, is a motion of the line of nodes, whereby it continually ſhifts its ſituation from eaſt to weſt, contrary to the order of the ſigns; completing its retrograde circulation in the compaſs of about nineteen years, after which time either of the nodes, having receded from any point of the ecliptic, returns to the ſame again.

RETROGRESSION *of curves*, their bending or turning backwards. See the articles FLEXURE and INFLECTION.

RETROMINGENTS, in natural hiſtory, a claſs or diviſion of animals, whoſe characteriſtic it is that they ſtale, or make water backwards, both male and female.

RETURN, *returna*, or *retorna*, in law, is uſed in divers ſenſes. 1. Return of writs by ſheriffs and bailiffs is a certificate made by them to the court, of what they have done in relation to the execution of the writ directed to them. This is wrote on the back of the writ by the officer, who thus ſends the writ back to the court from whence it iſſued, in order that it may be filed. 2. Return of a commiſſion, is a certificate or anſwer ſent to the court from whence the commiſſion iſſues, concerning what has been done by the commiſſioners. 3. Returns, or days in bank, are certain days in each term, appointed for the return of writs, *&c.* Thus Hillary term has four returns, *viz.* in the king's bench, on the day next after the octave, or eighth day after Hillary day: on the day next after the fifteenth day from St. Hillary: on the day after the purification, and on the next after the octave of the purification. In the common pleas, in eight days of St. Hillary: from the day of St. Hillary, in fifteen days: on the day after the purification: in eight days of the purification. Eaſter term has five returns, *viz.* in the king's bench, on the day next after the fifteenth day from Eaſter: on the day next after three weeks from Eaſter: on the day next after one month from Eaſter: on the day next after five weeks from Eaſter:

Fig. 1. RETORTS

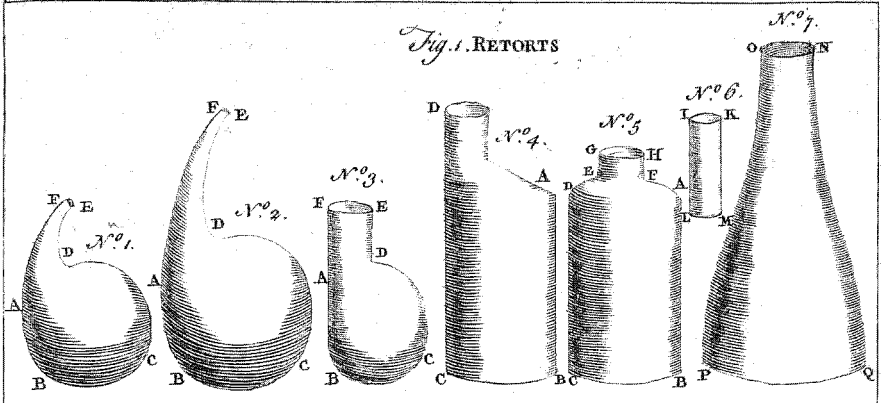


Fig. 2. The RHINOCEROS.

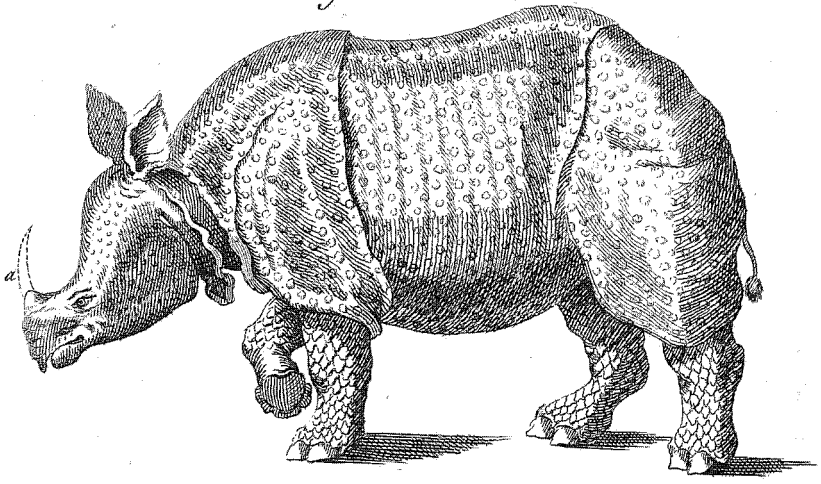


Fig. 3. RETROGRADATION

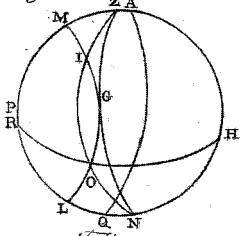


Fig. 4. RHOMBUS

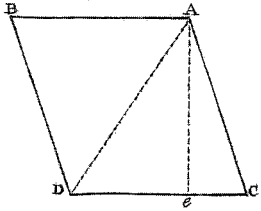


Fig. 5. RHOMBOIDES.

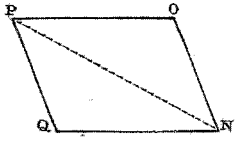


Fig. 7. RHUMB.

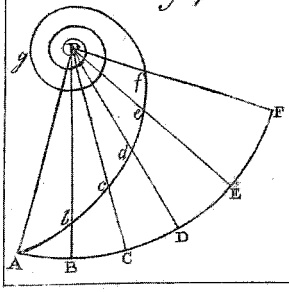


Fig. 8. RIBBAN.

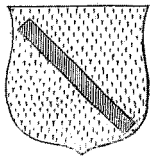
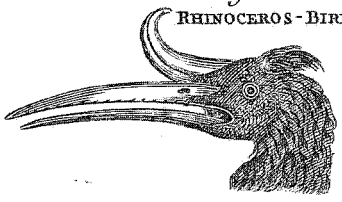


Fig. 6. The RHINOCEROS-BIRD



J. Jefferys sculp

Eaſter: and on the day next after the day following aſcenſion-day. In the common pleas, in fifteen days from the feaſt of Eaſter: in three weeks from the feaſt of Eaſter: in one month from Eaſter day: in five weeks from Eaſter day: on the day after the aſcenſion-day. Trinity term has four returns, *viz.* on the day following the ſecond day after Trinity: on the day following the eighth day after Trinity: on the day next after the fifteenth day from Trinity on the day next after three weeks from Trinity. In the common pleas, on the day after Trinity: in eight days of Trinity: in fifteen days from Trinity: in three weeks from Trinity. Michaelmas term has ſix returns, *viz.* on the day next after three weeks from St. Michael: on the day next after one month of St. Michael: on the day following the ſecond day after All-ſouls: on the day next after the ſecond day after St. Martin: on the day following the octave of St. Martin: on the day next after fifteen days of St. Martin. In the common pleas, in three weeks from St. Michael: in one month from St. Michael: on the day after All-ſouls: on the day after St. Martin: on the octave of St. Martin: in fifteen days from St. Martin. It is to be obſerved, that, as in the king's bench, all returns are to be made on ſome particular day of the week in each term, care muſt be taken not to make the writs out of that court returnable on a non-judicial day; ſuch as Sunday, and All-ſaints, in Michaelmas term, the purification in Hillary, the aſcenſion in Eaſter, and Midſummer-day, except it ſhould fall on the firſt day of Trinity term. See the article TERM.

RETURN, in building, is a ſide or part that falls away from the foreſide of any ſtrait work.

RETURNS *of a trench*, in fortification, are the turnings and windings which form the lines of a trench.

RETURNS *of a mine*, in fortification, are the windings of the gallery. See the articles GALLERY and MINE.

RETURNO HABENDO or RETURNUM AVERIORUM, is a writ which lies for a perſon who has avowed a diſtreſs by him made, and proved the ſame to be lawfully taken, for returning to him the cattle diſtrained which were before replevied by the party diſtrained.

The ſame writ is alſo granted when the action is removed by recordari or accedas ad curiam, into the court of common pleas; and he whoſe cattle were diſtrained, makes default and does not proſecute his action.

RETURNUM IRREPLEGIABILE, a writ for the final return of cattle to the owner, when found to be unjuſtly diſtrained.

REVE, REEVE, or GREVE, the bailiff of a franchiſe, or manor, thus called, eſpecially in the weſt of England. Hence ſhire-reve, ſheriff, port-greve, *&c.* See the article GREVE.

REVEILLE, a beat of drum about break of day, to give notice that it is time for the ſoldiers to ariſe, and that the centries are to forbear challenging.

REVEL, a port-town of Livonia, ſituated at the ſouth entrance of the gulph of Finland: eaſt long. 24°, north lat. 59°.

REVELATION, the act of revealing, or making a thing public that was before unknown: it is alſo uſed for the diſcoveries made by God to his prophets, and by them to the world; and more particularly for the books of the Old and New Teſtament. See BIBLE, INSPIRATION, FAITH, PROPHECY, *&c.*

The principal teſts of the truth of any revelation are, its being worthy of God, and conſiſtent with his known attributes, its being agreeable to the clear dictates of unprejudiced reaſon, and its having a tendency to refine, purify, and exalt the mind of man to an imitation of the Deity in his moral perfections.

Mr. Locke, in laying down the diſtinct provinces of reaſon and faith, obſerves, 1. That the ſame truths may be diſcovered by revelation, which are diſcoverable to us by reaſon. 2. That no revelation can be admitted againſt the clear evidence of reaſon. 3. That there are many things of which we have but imperfect notions, or none at all; and others, of whoſe paſt, preſent, or future exiſtence, by the natural uſe of our faculties we cannot have the leaſt knowledge: and theſe, being beyond the diſcovery of our faculties, and above reaſon, when revealed become the proper object of our faith. He then adds, that our reaſon is not injured or diſturbed, but aſſiſted and improved by new diſcoveries of truth coming from the fountain of knowledge. Whatever God has revealed is certainly true: but whether it be a divine revelation or no, reaſon muſt judge, which can never permit the mind to reject a greater evidence to embrace what is leſs evident. There can be no evidence that any traditional revelation is of divine original,

in the words we receive it, and the ſenſe we underſtand it, ſo clear and ſo certain, as that of the principles of reaſon: and, therefore, nothing that is contrary to the clear and ſelf-evident dictates of reaſon, has a right to be urged or aſſented to as a matter of faith, wherein reaſon has nothing to do. Whatſoever is divine revelation ought to over-rule all our opinions, prejudices, and intereſts, and has a right to be received with full aſſent: and ſuch a ſubmiſſion as this, of our reaſon to faith, takes not away the land-marks of knowledge.

REVELATION *of St. John*, the ſame with the apocalypſe. See APOCALYPSE.

REVELS, entertainments of dancing, maſking, acting comedies, farces, *&c.* antiently very frequent in the inns of court, and in noblemens houſes, but now much diſuſed. The officer who has the direction of the revels at court, is called the maſter of the revels.

REVENUE, the annual income a perſon receives from the rent of his lands, houſes, intereſt of money in the ſtocks, *&c.*

REVENUE, in hunting, a fleſhy lump formed chiefly of a cluſter of whitiſh worms on the heads of deer, ſuppoſed to occaſion their caſting their horns by gnawing them at the roots.

REVENUE is alſo uſed for a new tail of a partridge, growing after the lop of a former; this is meaſured by fingers; and thus they ſay a partridge of two, three, or four fingers revenue.

REVERBERATION, *reverberatio*, in phyſics, the act of a body repelling or reflecting another after its impinging thereon. See REPULSION.

REVERBERATION, in chemiſtry, denotes a kind of circulation of the flame by means of a reverberatory, or the return of the flame from the top of the furnace back to the bottom, chiefly uſed in calcination. Reverberation is of two kinds: the firſt with a cloſe fire, that is, a reverberatory furnace, where the flame has no vent atop, being covered with a dome or capital, which repells its action back on the matter or the veſſel that contains it, with increaſed vehemence. After this manner is refining, the diſtillation of acids, ſpirits, *&c.* performed. Reverberation with an open fire is that performed in a furnace or reverberatory, whoſe regiſters are all open, uſed in calcination, *&c.* See the next article.

REVERBERATORY, or REVERBERATING FURNACE, a chemical furnace built cloſe all around, and covered at the top with a capital of brick or tiles, ſo as not to give any vent to the heat or flame, but to determine it to reverberate or turn back from the brick-work with new force upon the matter placed at bottom. When the fire has no vent or paſſage atop, it is a whole reverberatory. When the middle of the capital is open, and only the ſides cloſe, ſo that there is only a half circulation of the flame, it is called an half reverberatory. The reverberatory furnace is chiefly uſed in the fuſion and calcination of metals and minerals, and on other occaſions where the moſt intenſe heat is required, as in aſſaying, *&c.* Whence it is alſo called the melting furnace, and aſſaying furnace. See the articles FURNACE, ASSAYING OVEN, LABORATORY, *&c.*

REVEREND, *reverendus*, a title of reſpect given to eccleſiaſtics.

The religious abroad are called reverend fathers; and abbeſſes, prioreſſes, *&c.* reverend mothers. With us, biſhops are right reverend, and archbiſhops, moſt reverend. In France, their biſhops, archbiſhops, and abbots, are all alike moſt reverend.

REVERIE, the ſame with delirium, raving, or diſtraction. See DELIRIUM, *&c.* It is uſed alſo for any ridiculous, extravagant imagination, action, or propoſition, a chimera or viſion. But the moſt ordinary uſe of the word, among engliſh writers, is for a deep diſorderly muſing or meditation.

REVERO, a town of Italy, in the dutchy of Mantua, ſituated on the ſouth of the Po, oppoſite to Oſtiglia, fifteen miles ſouth-eaſt of Mantua.

REVERSE, in law, *&c.* To reverſe ſignifies to undo, repeal, or make void.

REVERSE *of a medal, coin*, &c. denotes the ſecond or back-ſide, in oppoſition to the head or principal figure.

REVERSE, in fencing, a back ſtroke. See the article FENCING.

REVERSED, in heraldry, a thing turned backwards, or upſide down.

REVERSION, *reverſio*, in law, is defined to be returning of lands, *&c.* into the poſſeſſion of the donor, or his heirs.

Reverſion, in the law of England, has two ſignifications; the one of which is an eſtate left, which continues during a particular eſtate in being; and the other

is the returning of the land, &c. after the particular eſtate is ended; and it is further ſaid, to be an intereſt in lands, when the poſſeſſion of it fails, or where the eſtate which was for a time parted with, returns to the grantors, or their heirs. But, according to the uſual definition of a reverſion, it is the reſidue of an eſtate left in the grantor, after a particular eſtate granted away ceaſes, continuing in the grantor of ſuch an eſtate. The difference between a remainder and a reverſion, conſiſts in this, that the remainder may belong to any man except the grantor; whereas the reverſion returns to him who conveyed the lands, &c. See the article REMAINDER.

In order to render the doctrine of reverſions eaſy, we ſhall give the following table; which ſhew the preſent value of one pound, to be received at the end of any number of years not exceeding forty; diſcounting at the rate of 5, 4, and 3 per cent. compound intereſt. See the article INTEREST.

Years.	Value at 5 per Cent.	Value at 4 per Cent.	Value at 3 per Cent.
1	.9524	.9615	.9709
2	.9070	.9245	.9426
3	.8638	.8898	.9151
4	.8227	.8548	.8885
5	.7835	.8219	.8626
6	.7462	.7903	.8375
7	.7107	.7599	.8131
8	.6768	.7307	.7894
9	.6446	.7026	.7664
10	.6139	.6756	.7441
11	.5847	.6496	.7224
12	.5568	.6246	.7014
13	.5303	.6006	.6809
14	.5051	.5775	.6611
15	.4810	.5553	.6419
16	.4581	.5339	.6232
17	.4363	.5134	.6050
18	.4155	.4936	.5874
19	.3957	.4746	.5703
20	.3769	.4564	.5537
21	.3589	.4388	.5375
22	.3418	.4219	.5219
23	.3255	.4057	.5067
24	.3100	.3901	.4919
25	.2953	.3757	.4776
26	.2812	.3607	.4637
27	.2678	.3468	.4502
28	.2551	.3335	.4371
29	.2429	.3206	.4243
30	.2314	.3083	.4120
31	.2204	.2965	.4000
32	.2099	.2851	.3883
53	.1999	.2741	.3770
34	.1903	.2636	.3660
35	.1813	.2534	.3554
36	.1726	.2437	.3450
37	.1644	.2343	.3350
38	.1566	.2253	.3252
39	.1491	.2166	.3158
40	.1420	.2083	.3066

The uſe of the preceding table.—To find the preſent value of any ſum to be received at the end of a given term of years, diſcounting at the rate of 3, 4, or 5 per cent. compound intereſt. Find by the above table the preſent value of 1l. to be received at the end of the given term, which multiply by the number of pounds propoſed (cutting off four fingers from the product on account of the decimals) then the reſult will be the value ſought: For example, the preſent value of 10,000l. to be received ten years hence, and the rate of intereſt 5 per cent. is equal to .6139 × 10000 = 6139.0000l. or 6139l. Again, the preſent value of 10,000l. due in ten years, the rate of intereſt being 3 per cent. is .7441 × 10,000 = 7441.

REVERSION *of ſeries*, in algebra, a kind of reverſed operation of an infinite ſeries. See the article SERIES.

REVIEW, in chancery, is uſed for a bill, where a cauſe has been heard, and a decree thereon ſigned; but ſome error in law appearing upon the decree, or new matter being diſcovered after it was made, this bill is given for a freſh examination into the merits of the cauſe.

A bill of review muſt be exhibited by leave of the court, and is generally obtained upon oath made of the diſcovery of ſuch new matter. The ſum of 20l. muſt likewiſe be paid into court on the bringing of this bill, by way of ſecurity for coſts and delay, in caſe the matter ſhould be found againſt the party.

If one part of a decree in chancery be repugnant to another, the decree may be reverſed by a bill of review.

REVIEW, in war, is the appearance of an army, or part of an army, in order of battle, and their being viewed by the general, that he may know the condition of the troops, ſee that they are complete,

plete, and be a witneſs of the expertneſs with which they perform their evolutions and other exerciſes.

REVISE, among printers, a ſecond or third proof of a ſheet to be printed, taken off in order to be compared with the laſt proof, to ſee whether all the miſtakes marked in it are corrected. See the article PRINTING.

REVIVIFICATION, in chemiſtry, the ſame with reſuſcitation. See the article RESUSCITATION.

Bill of REVIVOR, in chancery, is a bill for reviving a cauſe, where either of the parties dies after the bill and anſwer, and before the cauſe is heard, or if heard, before the decree is inrolled: in which caſe this bill muſt be brought, praying that the former proceeding may ſtand revived, and be put upon the ſame footing as at the time of the abatement.

REVOCATION, in law, ſignifies the recalling, or annulling and making void ſome power, grant, deed, *&c.* made before.

REVOLUTION, in politics, ſignifies a grand change or turn in government. In which ſenſe, the revolution is uſed by way of eminence, for the great turn of affairs in England, in the year 1688, when king James II. abdicating the throne, the prince and princeſs of Orange were declared king and queen of England, *&c.*

In geometry the revolution of any figure, is its motion quite round a fixed line, as an axis.

The revolution of a planet, or comet, round the ſun, is nothing but its courſe from any point of its orbit till its return to the ſame. See ORBIT, PERIOD, PLANET and COMET.

REVULSION, in medicine, turning a flux of humours from one part to another, by bleeding, cupping, friction, ſinapiſms, bliſters, fomentations, bathings, iſſues, ſetons, ſtrong purging of the bowels, *&c.* Dr. Van Sweiten, in his Commentaries upon the Aphoriſms of Boerhaave, obſerves, that the uſe of revulſions in diſeaſes, is confirmed by daily experience as well as by reaſon; for ſo ſoon as the reſiſtance to the blood's motion is either diminiſhed or totally removed in any part of the body, it immediately flows into that part with a greater velocity. Thus when all the veſſels and viſcera of the abdomen are ſuddenly freed from a conſiderable preſſure by the birth of an infant, all the blood is frequently derived into thoſe veſſels ſo forcibly, that unleſs the fluid veſſels and viſcera are compreſſed by ſwathing with a roller, the child-bed woman may ſuddenly periſh in a fatal ſwoon, for want of the blood's due preſſure in the veſſels of the brain and cerebellum: the ſame thing alſo happens if the abdomen is not ſwathed, when all the water is diſcharged at once by paracenteſis, in the dropſy. If again we conſider, that the blood propelled by the heart is ſent partly up to the head, and ſuperior parts of the trunk, and partly downward to the viſcera and lower extremities, it will be from hence evident, that, by diminiſhing the reſiſtance of the lower veſſels, or by evacuating them, the quantity and impulſe of the blood will then be derived more towards the inferior parts, and drawn from thoſe that are ſuperior. It is therefore poſſible to make a revulſion of the arterial blood from an inflamed part to any other, eſpecially when the part towards which the revulſion is made, receives its blood from the ſame common trunks or larger arteries. The phyſicians foment the external parts of the head in inflammatory diſorders thereof, that the impulſe of the blood, being increaſed in the branches of the external carotide, may preſs with a leſs force upon the parts contained in the head. And Galen has long ago obſerved, that pains are eaſed almoſt as with a charm, by making a revulſion with cupping-glaſſes.

The different kinds of revulſion are phlebotomy, cupping, friction, veſicatories, iſſues, ſetons, warm bathing, fomentations, *&c.* See the articles PHLEBOTOMY, CUPPING, FRICTION, VESICATORY, *&c.*

REYGATE, or RYGATE, a borough of Surry, twenty-two miles ſouth-weſt of London.

It ſends two members to parliament.

REZANSKOI, the capital of the province of Rezan, in Ruſſia: eaſt long. 41°, north lat. 55°.

RHABDOIDES, in anatomy, the ſame with the ſagittal ſuture of the ſkull. See the articles SKULL and SUTURE.

RHABDOLOGY, in arithmetic, the doctrine of Neper's rods. See NEPER.

RHABDOMANCY, ῥαβδομαντεια, a ſpecies of divination performed by means of rods. See the article DIVINATION.

RHACHITIS, in medicine, the rickets. See the article RICKETS.

RHAGADES, in medicine, denotes chaps or clefts in any part of the body; ariſing either

either from an aridity of the parts, or acrimony of the humours; in both which caſes, cooling and emollient applications are proper.

RHAGADIOLIDES and RHAGADIOLUS, in botany, the ſame with lapſana. See the article LAPSANA.

RHAGOIDES, in anatomy, the ſecond coat or tunic of the eye, more uſually called uvea. See the article UVEA.

RHALADERGWY, a market-town in Radnorſhire, in Wales, ſituated fifteen miles weſt of Radnor.

RHAMNOIDES, in botany, Tournefort's name for the hippophae. See the article HIPPOPHAE.

RHAMNUS, in botany, a genus of the *pentandria-monogynia* claſs of plants, the corolla whereof conſiſts of a ſingle, unperforated, infundibuliform petal, rude on the outſide, and coloured within: the tube is of a turbinated cylindric figure; the limb patent, divided and acute at the baſe of every ſegment: the petal has little ſquammula, which is connivent inwardly; the fruit is a roundiſh naked berry, divided within into fewer cells than there are ſegments of the corolla; the ſeeds are ſingle, roundiſh, gibbous, and compreſſed on one ſide.

This genus comprehends the buckthorn, the black alder, Chriſt's thorn, the alaternus, and the jujube-tree. See the articles JUJUBE and ALATERNUS.

Buckthorn-berries bruiſed on white paper, give it a green tincture; they are in conſiderable eſteem as a cathartic, and are celebrated in dropſies, rheumatiſms, and even in the gout; but they generally occaſion gripes, ſickneſs, dry the mouth and throat, and leave a thirſt of long duration. the doſe is about twenty of the freſh berries in ſubſtance, and twice or thrice this number in decoction; an ounce of the expreſſed juice, or a dram of the berries dried. A ſyrup prepared of the juice is kept in the ſhops.

RHAPHONTICOIDES and RHAPHONTICUM, the ſame with the centauria. See the article CENTAURIA.

RHAPHONTICUM is alſo the name for the root of the rheum. See RHEUM.

RHAPSODI, ῥαψῳδοι, *rhapſodiſts*, in antiquity, perſons who made a buſineſs of ſinging pieces of Homer's poems. Cuper informs us, that the rhapſodi were cloathed in red when they ſung the Iliad, and in blue when they ſung the Odyſſee. They performed on the theatres, and ſometimes ſtrove for prizes in conteſts of poetry, ſinging, &c. After the two antagoniſts had finiſhed their parts, the two pieces or papers they were written in were joined together again: whence the name, *viz.* from ῥαπτω, *ſuo*, and ωδη, *canticum*: but there ſeems to have been other rhapſodi of more antiquity than theſe people, who compoſed heroic poems or ſongs in praiſe of heroes and great men, and ſung their own compoſitions from town to town for a livelihood, of which profeſſion Homer himſelf is ſaid to be.

RHAPSODOMANCY, an antient kind of divination performed by pitching on a paſſage of a poet at hazard, and reckoning on it as a prediction of what was to come to paſs. There were various ways of practiſing this rhapſodomancy. Sometimes they wrote ſeveral papers or ſentences of a poet on ſo many pieces of wood, paper, or the like, ſhook them together in an urn, and drew out one which was accounted the lot: ſometimes they caſt dice on a table whereon verſes were written, and that whereon the die lodged, contained the prediction. A third manner was by opening a book, and pitching on ſome verſe at firſt ſight. This method they particularly called the ſortes Præneſtinæ; and afterwards, according to the poet made uſe of, ſortes Homericæ, ſortes Virgilianæ, &c. See the article SORTES.

RHAPSODY, ῥαψῳδια, in antiquity, a diſcourſe in verſe ſung or rehearſed by a rhapſodiſt. Others will have rhapſody to ſignify a collection of verſes, eſpecially thoſe of Homer, which having been a long time diſperſed in pieces and fragments, were at length, by Piſiſtratus's order, digeſted into books called rhapſodies, from ῥαπτω, *ſuo*, and ωδη, *canticum*. Hence, among moderns, rhapſody is alſo uſed for an aſſemblage of paſſages, thoughts, and authorities raked together from divers authors, to compoſe ſome new piece.

RHE, or REE, a little iſland in the bay of Biſcay, near the coaſt of Aunis in France: weſt long. 1° 30′, north lat. 46° 14′.

RHEEDEA, in botany, a genus of plants the characters whereof are not perfectly aſcertained: there is no calyx; the corolla conſiſts of four patent, concave, vertically ovated petals; the filaments are numerous, the germen globoſe; the fruit is oval, ſmall, ſucculent, and unilocular;

locular; the ſeeds are three, of an ovato-oblong figure, long and odly furrowed.

RHEIMS, or REIMS, a city of France, capital of the province of Champain, one of the moſt elegant cities in France, ſituated ſeventy-five miles north-eaſt of Paris: eaſt long. 4°, north lat. 49° 20'.

RHETORIANS, a ſect of heretics in Egypt, ſo denominated from Rhetorius their leader. The diſtinguiſhing doctrine of this hereſiarch, as repreſented by Philaſtrius, was, that he approved of all the hereſies before him, and taught that they were all in the right.

RHETORIC, *rhetorica*, the art of ſpeaking copiouſly on any ſubject, with all the advantage of beauty and force.

Lord Bacon defines rhetoric very philoſophically, to be the art of applying and addreſſing the dictates of reaſon to the fancy, and of recommending them there ſo as to affect the will and deſires. The end of rhetoric, the ſame author obſerves, is to fill the imagination with ideas and images which may aſſiſt nature without oppreſſing it. Voſſius defines rhetoric, the faculty of diſcovering what every ſubject affords of uſe for perſuaſion. Hence, as every author muſt invent arguments to make his ſubject prevail, diſpoſe thoſe arguments, thus found out, in their proper places, and give them the embelliſhments of language proper to the ſubject; and if this diſcourſe be intended to be delivered in public, utter them with that decency and force which may ſtrike the hearer; rhetoric becomes divided into four parts, invention, diſpoſition, elocution, and pronunciation. See INVENTION, DISPOSITION, ELOCUTION, and PRONUNCIATION.

Rhetoric and oratory differ from each other as the theory from the practice; the rhetorician being he who deſcribes the rules of eloquence, and the orator he who uſes them to advantage. Ordinarily, however, the two are uſed indifferently for each other. See the article ORATORY.

For the characters in rhetoric, ſee the article CHARACTER.

RHETORICAL NUMBERS. See the article NUMBER.

RHEUM, ῥεῦμα, a thin ſerous humour, occaſionally ooſing out of the glands about the mouth and throat. See the article HUMOUR.

Rheum is alſo uſed for a catarrh. See the article CATARRH.

For the rheum in the eyes, ſee the article EPIPHORA.

RHEUM, the RHAPHONTIC PLANT, in botany, a genus of the *enneandria-trigynia* claſs of plants, the corolla whereof conſiſts of a ſingle petal, which is narrow at the baſe and impervious: the limb is divided into ſix obtuſe ſegments, alternately ſmaller: there is no pericarpium: the ſeed is ſingle, large, triquetrous, acute, and ſurrounded with membranaceous rims.

The root of this plant, which appears evidently to have been the rhubarb of the antients, is by many confounded with the modern rhubarb, though conſiderably different both in appearance and quality. The rhaphontic root is of a duſky colour on the ſurface, of a looſe ſpongy texture, conſiderably more aſtringent, but leſs purgative than the rhubarb; in this laſt intention two or three drams are required for a doſe. It is an ingredient in the venice-treacle, and in ſome of the colder compoſitions of the ſhops, but in theſe rhubarb is generally uſed in its place.

Rhaphontic-root, the pound, pays, on importation, 2 s. and 7 d. and, on exportation, draws back 2 s. $3\frac{20}{100}$ d.

RHEUMATISM, in medicine, a diſtemper that happens moſt commonly in ſpring or autumn, when there is a remarkable change of air from hot to cold, and from cold to hot, or when the wind ſuddenly ſhifts to any oppoſite point. It begins, according to Sydenham, with a ſhivering and other ſymptoms of a fever, and in a day or two's time, or ſometimes ſooner, a vehement pain ſeizes one or more of the limbs, raging ſometimes in one place and ſometimes in another, eſpecially in the arms, wriſts, ſhoulders, and knees: very often there is a redneſs and ſwelling, and the fever gradually goes off while the pain remains. This diſtemper often runs out into a great length, continuing ſometimes for ſome months or years, not perpetually, with the ſame violence, but coming and going, and from time to time renewing its paroxyſms.

It chiefly attacks perſons in the flower of their age, after violent exerciſe, or a great heat of the body from any other cauſe, and then being too ſuddenly cooled. Its proximate cauſe Boerhaave takes to be an inflammation of the lymphatic arteries of the membranes near the liga-

ments

ments of the joints, but not ſo violent as to bring on a ſuppuration. This diſeaſe is nearly a-kin to the gout and ſcurvy, and the blood is like that of thoſe afflicted with the pleuriſy. The pain is exaſperated upon the leaſt motion: it ſometimes attacks the loins and coxendix, and ſometimes the brain, lungs, and viſcera: when it ſeizes the loins it is then called lumbago: in this caſe, Sydenham obſerves that there is a moſt violent pain in the ſmall of the back, which ſometimes extends to the os ſacrum, and is like a fit of the gravel, only the patient does not vomit. If this diſeaſe is unſkilfully treated, it may continue ſeveral months or years, but not always with the ſame violence, but by fits. If it continues and encreaſes, it may cauſe a ſtiff joint, which will ſcarce yield to any remedy.

Sydenham directs to take away ten ounces of blood on the ſide affected; this muſt be repeated three or four times, or oftener, once every other or every third day, according as the ſtrength of the patient will bear. The diet muſt be very thin, and an emulſion of the four cold ſeeds may be given; as alſo a pultice of white-bread and milk, tinged with a little ſaffron, may be laid to the part affected: a clyſter of milk and ſugar may be injected on thoſe days the bleeding is omitted. If the patient cannot bear frequent bleeding, after the ſecond or third time give the common purging potion every other day, and an ounce of diacodium at night, till he recovers.

In an incipient rheumatiſm of the ſhoulders, Hoffman ſays that nothing is better than a bliſter laid between the ſcapulæ; but if it happens to the plethoric, cupping, with ſcarification in the lower parts, repeated every month, does ſignal ſervice. The ſame phyſician thinks it may be proper to chew rhubarb, from two ſcruples to a dram, with raiſins or currants, two or three times a week.

The ſpirit of hartſhorn and the balſam of guaiacum, given in the quantity of twenty or thirty drops, three or four times a day, Dr. Shaw ſays, is of great ſervice: but he thinks nothing better than a decoction of the ſudorific woods, to the quantity of a quart a day, for a month or ſix weeks together. This laſt, when aſſiſted with crude antimony and mercurius dulcis, Hoffman recommends in the venereal rheumatiſm, which often ariſes from the remains of a lues venerea contained in the maſs of blood. In a ſcorbutic rheumatiſm, or that ariſing from the ſcurvy, Sydenham directs the patient to take the ſcorbutic electuary and water, if he cannot bear any kind of evacuation.

He obſerves, that young perſons who live temperately may be cured by a ſimple refrigerating diet, and moderate nouriſhing, with as much certainty as by repeated bleeding: for inſtance, let the patient live four days upon whey alone; and after that white bread may be allowed for dinner, and on the laſt day of his illneſs he may be allowed it for ſupper. When the ſymptoms ceaſe he may have boiled chickens, or any thing of eaſy digeſtion, but every third day he muſt live upon whey only, till his ſtrength returns. Boerhaave's method of cure is to the ſame effect, only he adviſes warm baths and ſtrong bliſters to be laid upon the part affected, nay even cauteries themſelves: but Hoffman obſerves that great caution ſhould be uſed with regard to topics, for if the patient's conſtitution is ſanguineous they ſhould all be avoided, and the part covered carefully with the bed-cloaths; but if there is a thick, cold, ſtagnating humour in the part, and a ſenſe of cold, with a ſtricture of the pores, then frictions may be uſed with rough warm cloths, and afterwards cupping with ſcarifications. If the part becomes ſtiff and inflexible, with a numbneſs, which is called a pareſis, then take human or canine axungia, two ounces; balſam of Peru, and oil of cloves, each two drams; with which make a liniment for the part: this has been known to have a wonderful effect.

Arbuthnot ſays that cream of tartar in water-gruel, taken for ſeveral days, will abate the pains and ſwellings conſiderably by its acidity, correcting the alkaline ſalts of the blood.

Cheyne ſays, that the hot and inflammatory rheumatiſms have all the ſymptoms of the gout, and, like it, change from place to place, and by over violent evacuations may be tranſlated upon the noble organs.

RHEXIA, in botany, a genus of the *octandria-monogynia* claſs of plants, the corolla whereof conſiſts of four roundiſh patent petals inſerted into the calyx; the fruit is a roundiſh capſule, formed of four valves, containing four cells, and incloſed in the belly of the cup; the ſeeds are roundiſh and numerous.

RHEXIS, among oculiſts, denotes a rupture of the cornea of the eye. See the article EYE.

RHIME, in poetry. See RHYME.

RHINANTHUS, YELLOW-RATTLE, in botany, a genus of the *didynamia-angioſpermia* claſs of plants, the corolla whereof is a ringent ſingle petal; the tube is almoſt cylindric, and of the length of the cup; the limb is dehiſcent, and compreſſed at the baſe; the upper lip is galeated, compreſſed, emarginated and narrow; the lower one is patulous, plane and ſemitrifid: the fruit is an orbiculated, erect, compreſſed, bilocular and bivalved capſule: the ſeeds are numerous and compreſſed.

RHINE, a great river riſing in the country of the Griſons, in Switzerland, and running north, continues its courſe till it forms the lake of Conſtance; from whence it turns weſt, and having viſited Baſil, runs north, dividing Suabia from Alſatia; from thence it runs through the Palatinate, and receiving the Neckar, the Maine and the Moſelle, continues its courſe north by Mentz, *&c.* After entering the Netherlands at Skenkinchans, it is divided into ſeveral channels, the two largeſt whereof obtain the names of the Lech and the Waal, which running through the United-provinces diſcharge themſelves into the German Sea, below Rotterdam.

RHINE *lower circle* conſiſts of the Palatinate of the Rhine and the three eccleſiaſtical electorates, *viz.* thoſe of Cologn, Mentz, and Triers.

RHINE *upper circle* conſiſted of the Landgraves of Alſatia and Heſſe, comprehending the Wetteraw: but only Heſſe can be accounted a part of Germany at preſent, France having united Alſace to that kingdom.

RHINEBURG, a town of Germany, in the circle of the lower Rhine and electorate of Cologn, ſituated fifteen miles eaſt of Gelder.

RHINEFIELD, the name of two towns of Germany, one whereof is ſituated in the circle of Suabia, on the Rhine, eight miles eaſt of Baſil; the other is the capital of the county of Rhinefield, ſituated in the circle of the upper Rhine, ſixteen miles north-weſt of Mentz.

RHINE-LAND-ROD, in fortification, *&c.* a meaſure of two fathoms, or twelve feet, uſed by the Dutch and German engineers, *&c.*

RHINOBATUS, in ichthyology, a ſpecies of the raja, with only a ſingle row of prickles in the middle of the back. See the article RAJA.

RHINOCEROS, in zoology, an order of the jumenta, having eleven fore-teeth in each jaw; there are no canine teeth; the noſe is ornamented with a ſingle or double horn, which is permanent. This, of all quadrupeds, approaches neareſt to the elephant in ſize, the body being nearly as bulky, but the legs much ſhorter. A full grown rhinoceros is fourteen feet high, and the legs are ſo ſhort with all this height, that the belly comes near the ground: the head is very large and oblong, of an irregular figure, broad at top and depreſſed towards the ſnout: the ears reſemble thoſe of a hog: the eyes are very ſmall, and ſituated at a ſmall diſtance from the extremity of the ſnout: on the upper part of the ſnout, near the extremity, ſtands the horn, growing to about two feet and a half in length, bent a little back, of a black colour, and vaſtly firm and hard: the ſkin is remarkably thick and hard, ſo that the creature could not turn its body in any direction but for the joints and folds in it: the tail is ſhort, and furniſhed with ſome long and extremely thick black hairs. See plate CCXXXII. fig. 2. which repreſents a young rhinoceros with a ſhort obtuſe horn; there being ſome ſpecies which have the horn much longer.

RHINOCEROS BIRD, a large bird about the ſize of the european raven, which it greatly reſembles: it is ſo called from a true horn, which, riſing from the root of the beak, bends upwards. See plate CCXXXII. fig. 6.

There are other two varieties of this horn brought from the eaſt-Indies, all belonging to different ſpecies of hydrocorax. See HYDROCORAX.

RHIZOPHORA, in botany, a genus of the *dodecandria-monogynia* claſs of plants, called, by Plumier, mangles: the flower is erect, being compoſed of a ſingle petal, divided into four ſegments; the ſeed is ſingle, very long, and of a clavated figure, pointed at the end.

RHODES, the capital of an iſland of that name, ſituated in the Mediterranean-ſea, in eaſt long. 28°, and between 36° and 37° north lat.

RHODIOLA, or RHODIA, in botany, a genus of the *polygamia-dioecia* claſs of plants, which produces two kinds of flowers, *viz.* hermaphrodite and female ones; both which are compoſed of four petals,

petals, only much longer in the hermaphrodite than in the female flowers: the fruit conſiſts of four corniculated capſules, containing numerous roundiſh ſeeds.

RHODIUM LIGNUM, RHODIAN WOOD, in botany, the ſame with aſpalathum. See the article ASPALATH.

Jamaica affords a wood, called, by the people there, roſe-wood; which, though not the rhodium of the ſhops, has nevertheleſs much of its ſmell: it is deſcribed by Sir Hans Sloane to be a tree growing to twenty or more feet in height, and thick enough to afford the largeſt ſegments we ever meet with of it; and poſſibly an adulteration of the true rhodium with this wood may be the true cauſe why the rhodium is not allowed to be the root, but a ſpecies of cytiſus, as Hoffman affirms.

The flowers of the jamaica roſe-wood are ſmall and white, conſiſting of three petals, and ſtanding in cluſters: the fruit is a berry of the ſize of a pepper-corn; and the leaves of the tree are pinnated.

RHODON, in pharmacy, an appellation given to ſeveral compoſitions, on account of roſes being the chief ingredient in them; as the diarrhodon, rhodoſaccharum, *&c.* See DIARRHODON and ROSE.

RHOMBOIDES, in geometry, a quadrilateral figure whoſe oppoſite ſides and angles are equal, but is neither equilateral nor equiangular; as the figure N O P Q, plate CCXXXII. fig. 5.

RHOMBOIDES, in anatomy, a thin, broad, and obliquely ſquare fleſhy muſcle, ſituated between the baſis of the ſcapula and the ſpina dorſi; ſo called from its figure. Its general uſe is to draw, backward and upward, the ſubſpinal portion of the baſis ſcapulæ.

RHOMBUS, in geometry, an oblique-angled parallelogram, or a quadrilateral figure whoſe ſides are equal and parallel, but the angles unequal, two of the oppoſite ones being obtuſe, and the other two acute, as A B C D, plate CCXXXII. fig. 4.

To find the area of a rhombus, upon C D, aſſumed as a baſe, let fall the perpendicular A *e*, which is the altitude of the figure; then multiply the baſe by the altitude, the product will be the area.

RHOMBUS, the PEARL-FISH, in ichthyology, a ſpecies of pleuronectes, with the eyes on the left ſide: it is a moderately large ſpecies, but is not ſo thick and fleſhy as the turbot, nor is its fleſh ſo well taſted. See the articles PLEURONECTES and TURBOT.

RHONE, one of the largeſt rivers in France, which riſing in one of the Alps of Switzerland, paſſes through the lake of Geneva, viſits that city, and then runs ſouth-weſt to Lyons, where joining the river Soane, it continues its courſe due ſouth, paſſing by Orange, Avignon, and Arles, and falls into the Mediterranean a little weſtward of Marſeilles.

RHOPALIC VERSES, in antient poetry, a kind of verſes, which beginning with monoſyllables, were continued in words growing gradually longer and longer to the laſt.

RHOPOGRAPHI, in antiquity, painters who confined themſelves to low ſubjects, as animals, plants, landſkips, *&c.* See the article PAINTING.

RHUBARB, *rhabarbarum*, in pharmacy, a thick root, of an oblong figure, large at the head, and tapering pretty ſuddenly as it extends in length. It is ſometimes ſingle, but more uſually divided into two or three parts at the lower end. We frequently meet with it in pieces of four, five, or ſix inches long, and three or four in diameter at the top; it is of a tolerably ſmooth and even ſurface, and externally of a faint yellow colour, with a large admixture of brown; it is moderately heavy but not hard; it cuts through very freely and eaſily with a knife, eſpecially if the blade of it has been rendered a little unctuous, firſt by drawing it over an almond or any other fatty ſubſtance. When freſh cut it is found to be of a marbled or variegated appearance; its colours are a pale but bright yellow, and a faint reddiſh. The yellow is the ground-colour, and the red is diſpoſed in ſhort irregular veins, much in the manner of the darker colour in the common nutmeg. It is of a ſomewhat lax and ſpongy texture; it has an agreeable and aromatic ſmell, and a bitteriſh, aſtringent, and ſubacid taſte, upon the whole not diſagreeable: it tinges the ſpittle to a fine bright yellow on being held ſome time in the mouth.

Rhubarb is to be choſen freſh, tolerably hard and moderately heavy, and ſuch as does not duſt the fingers in handling; ſuch as infuſed a few minutes in water gives it a fine yellow, and, when bruiſed in a mortar, has a reddiſh colour with the yellow. Rhubarb is not ſo often adulterated as damaged; care is to be taken

that it be not wet, nor rotten; much of it is ſubject, after ſteeping too long, to be worm-eaten and full of holes on the ſurface. There are certain traders in this drug, who have a way of filling up theſe holes with the powder of ſome of the worſt and moſt decayed pieces; but this is eaſily diſcovered, and ſuch rhubarb ought always to be rejected.

The antients were not acquainted with the true rhubarb: their rhubarb appears to be the rheum, or raphontic plant which, tho' Linnæus makes it the ſame with the rhubarb, is yet very different in quality if not in characters. See RHEUM.

The rhubarb is brought to us from Ruſſia, and from the eaſt-Indies. It is produced in great plenty on the confines of China and Tartary, and in many parts of Tartary itſelf: the mountains of Tibet abound with it, and a very conſiderable part of what is ſent into Europe grows there.

It was long before the rhubarb was known in Europe, but of late it has been ſent from Ruſſia to the gardens of Paris and Chelſea, in both which it thrives extremely well, and ſtands the ſeveral colds unhurt. Other authors make it the lapathum bardanæ folio undulato glabro: and as there are ſufficient proofs that we now have the true rhubarb among us, it will be eaſy to propagate a quantity of it, in order to try whether its virtues, when produced with us, will be the ſame with thoſe it poſſeſſes as brought from its native climate. See LAPATHUM.

The root of the native rhubarb plant is long, thick, and perennial; its bark, while growing, is of a browniſh red colour; but under this the ſubſtance of the root is of the true colour of dried rhubarb, only deeper, of the right nutmeg-grain, marbled with red and yellow, and has the true ſmell and taſte of rhubarb, eſpecially about the upper part of the root: it has a viſcoſity indeed in the mouth, tho' rhubarb, as we meet with it in the ſhops, has not; but this may only be the difference of the ſame root freſh and dried.

Rhubarb poſſeſſes the double virtue of a cathartic and an aſtringent; it readily evacuates particularly the bilious humors, and afterwards gently aſtringes and ſtrengthens the ſtomach and inteſtines. It is given with great ſucceſs in all obſtructions of the liver, in the jaundice, in diarrhœas, and in the fluor albus and gonorrhœas: it is alſo an excellent remedy againſt worms. It is ſometimes given as a purgative, ſometimes as only an alterant; and, which ever way it is taken, it is an excellent medicine, agreeing with almoſt all ages and conſtitutions. The only caſes in which its uſe is to be avoided, are thoſe in which the blood and viſcera are too hot. Fallopius ſays it is never to be given to people who have diſorders of the kidnies or bladder, as it is apt to occaſion an extraordinary heat in thoſe parts; and Simon Pauli tells us of vertigoes brought on by a too free and continued uſe of it.

Rhubarb is given in powder in infuſion, and in its own crude ſolid ſtate; the chewing it perhaps being the beſt way of giving it of all others, when it is intended to ſtrengthen the ſtomach and aſſiſt digeſtion; the quantity of twenty-five grains, or thereabout, ſhould be chewed daily on thoſe occaſions, an hour before eating; this is alſo by much the beſt way of taking it againſt obſtructions of the viſcera. Its doſe in powder is from half a ſcruple to two ſcruples; in infuſion, about a drachm of it will purge gently; but the doſe may be increaſed to two drachms. It is obſervable, that neither the infuſion, nor the decoction, nor even the extract of rhubarb, purge near ſo briſkly as the root itſelf in powder.

The preparations of rhubarb in uſe in the ſhops are, 1. The tincture in ſpirit. 2. The tincture in wine: and, 3. The extract; though the laſt is but little uſed.

Monk's RHUBARB, *rhaponticum*. See the article RHAPONTICUM.

White RHUBARB, a name given to mechoacan. See the article MECHOACAN.

RHUMB, RUMB, or RUM, in navigation, a vertical circle of any given place, or the interſection of ſuch a circle with the horizon; in which laſt ſenſe rhumb is the ſame with a point of the compaſs. See the article COMPASS.

RHUMB-LINE, *loxodromia*, is alſo uſed for the line which a ſhip deſcribes when ſailing in the ſame collateral point of the compaſs, or oblique to the meridians. Now that ſuch rhumb-lines are ſpirals, which continually approach to the pole but never fall into it, as *A b c d e f g*, plate CCXXXII. fig. 7, is evident for the following reaſons. In any place on the ſurface of the globe, the rhumb running north and ſouth, coincides with the meridian of that place; the eaſt and weſt

rhumbs

rhumbs are perpendicular to the meridian, and the other rhumbs are oblique to it: but this obliquity is the ſame under every meridian; and therefore all the rhumbs, except the north and ſouth, cut the meridians at equal angles. When right lines are parallel to each other, a right line will cut them at equal angles; but not ſo when they are inclined to one another: therefore ſeveral inclining lines cannot be cut at equal angles, but by a curve line bending towards the place where thoſe lines would meet. Now the meridians being inclined to each other, and meeting in the poles, the oblique rhumbs muſt be curve-lines continually approaching the poles. But, in every latitude, an oblique rhumb runs between the preſent parallel and the pole; and a line cannot cut ſeveral other lines at equal angles in the ſame point: conſequently the rhumb-lines are ſpirals, which continually wind round the poles without ever falling into them.

Again, that theſe ſpiral rhumbs, on the globe, are of the ſame kind with the proportional ſpiral, will appear hence: let PABC, *&c.* (*ibid.*) be the ſtereographic projection of part of the ſphere, on the plane of the equator; where ABC DEF is part of the equator; P the pole; PA, PB, PC, *&c.* are meridians; and the ſpiral A*bcdefg*, one of the rhumbs. Now, in ſuch a projection, the lines interſecting each other, form angles equal to the angles on the ſphere which they repreſent: therefore the projection of the rhumb, A*bcd*, *&c.* cuts the radii, or meridians, PA, PB, PC, *&c.* at equal angles; and as this is a property of the proportional ſpiral, the ſpiral rhumbs muſt be analogous to the proportional ſpiral. Hence the differences of longitude AB, AC, AD, *&c.* are the logarithms of the intercepted parts of the meridians, P*b*, P*c*, P*d*, *&c.*

RHUS, *ſumach*, in botany, *&c.* See the article SUMACH.

RHYME, RHIME, RYME, or RIME, in poetry, the ſimilar ſound, or cadence and termination of two words which end two verſes, *&c.* Or rhyme is a ſimilitude of ſound between the laſt ſyllable or ſyllables of a verſe, ſucceeding either immediately or at a diſtance of two or three lines.

Rhymes are either ſingle, double, or triple, though the two laſt are much diſuſed. Single rhymes are divided into perfect or whole rhymes, and imperfect or half rhymes. A whole or perfect rhyme is where there is a ſimilitude of ſound without any difference: an imperfect rhyme is where there is a ſimilitude of ſound, with a difference either in reſpect of the pronunciation or orthography, but chiefly the former. Single rhymes are again divided into feminine and maſculine rhymes: the feminine rhyme is that where the laſt ſyllable of the rhyme ends with an *e* mute: and the maſculine rhymes are thoſe of all other words. Double rhymes are thoſe where two words terminate alike through the whole two laſt ſyllables. Plain rhymes are thoſe where the two rhyming verſes ſucceed immediately to each other: and croſs rhymes are thoſe where the verſes are ſo diſpoſed as that the firſt rhymes with the third, and the ſecond with the fourth.

There is no rule in poetry, ſays Du Bos, whoſe obſervance coſts ſo much trouble, and is productive of leſs beauties in verſe, than that of rhyming. Rhyme frequently maims and almoſt always enervates the ſenſe of the diſcourſe, for one bright thought which the paſſion of rhyming throws in our way by chance, is, without doubt, every day the cauſe of a hundred others that people would bluſh to make uſe of were it not for the richneſs or novelty of the rhyme with which theſe thoughts are attended.

And yet the allurement of rhyme has nothing in it worth comparing to the charms of numbers and harmony. The terminating of a ſyllable with a particular ſound is no beauty in itſelf. The beauty of a rhyme is only a relative one, which conſiſts in a conformity of termination between the two laſt of two correſponding verſes. This ornament therefore, which is of ſo ſhort a duration, is perceived only at the end of two verſes, and after having heard the laſt word of the ſecond verſe, which rhymes to the firſt. One is not even ſenſible of this pleaſure, but at the end of three or four verſes, if the maſculine and feminine rhymes are interwoven, ſo that the firſt and fourth be maſculines, and the ſecond and third feminines: a mixture which is very much uſed in ſeveral kinds of poetry. But even in thoſe verſes where the richneſs thereof diſcovers itſelf at the end of the ſecond verſe, it is the greater or leſſer conformity between the two laſt words of theſe verſes, which forms its elegance. Nor, for the moſt part, do people upon hearing the ſecond rhyme,

recal

real the firſt diſtinctly enough, to be charmed with their perfection. Their merit is known rather by reflection than ſenſation, ſo trifling is the pleaſure by which it tickles the ear. Numbers and harmony are a light which throws out a conſtant luſtre; but rhyme is a mere flaſh, that diſappears after having given only a ſhort-lived ſplendor. See the articles NUMBER, METRE, *&c.*

Rhyme owes its origin to the barbarouſneſs of our anceſtors. The people from whom the modern nations are deſcended, and who ſubverted the roman empire, had their poets, who being ignorant, and the languages in which they wrote not ſufficiently improved to bear a handling according to the rules of metre, they fancied there would be ſome ornament in terminating with the ſame ſound two conſecutive or relative parts of a diſcourſe, both of which were to be of an equal extent. Thus, in all probability, it was that rhyme firſt roſe in Europe. Theſe new-born languages were not only forced to ſubmit to the ſlavery of rhyming, but it paſſed even to the latin tongue, the uſe of which was ſtill retained by a particular ſet of people. The practice of leonine verſe was introduced as early as the VIIIth century, and prevailed at the time the following ones were made,

Fingitur hac ſpecie bonitatis odore refertus,
Iſtius eccleſiæ fundator rex Dagobertus.

Theſe leonine verſes diſappeared upon the riſing of that light, whoſe dawn appeared in the XVth century.

Since the reſtoration of learning in the XVIth century, attempts have been made to baniſh rhyme out of the modern poetry, and to ſettle the engliſh and french verſes on the footing of the antient greek and latin ones, by fixing the qnantities of ſyllables and truſting wholly to thoſe, and to the numbers and meaſure. This Milton has done with great ſucceſs, and after him Philips, Addiſon, Thomſon, Young, and ſome others. Verſes of this kind are called blank verſes. The French have attempted the ſame, but not with equal ſucceſs; which has convinced the world, that this kind of meaſure is inconſiſtent with the french tongue.

RHYPTICS, *ῥυπτικα*, in medicine, detergent remedies. See DETERGENTS.

RHYTHM, *ῥυθμος*, in muſic, the variety in the movement, as to the quickneſs or ſlowneſs, length or ſhortneſs of the notes. Or it may be defined more generally, the proportion which the parts of the motion have to each other. See the next article.

Ariſtides, among the antient muſicians, applies the word rhythmus three ways, *viz.* either to immoveable bodies, when their parts are rightly proportioned to each other, as a well made ſtatue, *&c.* Or to things that move regularly, as in dancing, in the dumb-ſhews of pantomimes, *&c.* Or, thirdly, to the motion of ſound, or voice, in which the rhythmus conſiſts of ſhort and long ſyllables, or notes, joined together in ſome kind of order, ſo as their cadence on the ear may be agreeable. This, in oratory, is what we call numerous ſtyle; and when the tones of the voice are well choſen, an harmonical ſtyle. See STYLE.

In effect, rhythm, in general, is perceived either by the eye or ear, and may be either with or without metre; but the ſtrict rhythm of muſic is only perceived by the ear, and cannot exiſt without it. The firſt either exiſts without ſound, as in dancing; or with ſounds. It may be either without any difference of acute and grave, as in a drum; or with a variety of theſe, as in a ſong. The rhythm of the antients, Mr. Malcolm obſerves, was very different from that of the moderns: the former was only that of the long and ſhort ſyllables of the words and verſes, and had no other forms or varieties than what the metrical art afforded. The changes therein are nothing but thoſe made from one kind of metre to another, as from iambic to choraic, *&c.* In the modern muſic, the conſtitution of the rhythm differs from that of the verſe ſo far, that in ſetting muſic to words, the thing chiefly regarded, is to accommodate the long and ſhort notes to the ſyllables in ſuch a manner as that the words be well ſeparated, and the accented ſyllables of each word ſo conſpicuous, that what is ſung may be diſtinctly underſtood. See MELODY.

Voſſius ſays, the rhythm, which does not expreſs the very forms and figures of things, can have no effect; and that the antient poetical numbers alone are juſtly contrived for this end. He adds, that the modern languages and verſe are altogether unfit for muſic; and that we ſhall never have any right vocal muſic, till our poets learn to make verſes capable to be ſung, *i. e.* till we new-model our language, reſtore the antient quantities and metrical feet, and baniſh our barbarous rhymes. Our verſes, ſays he, run as it were all on one foot, ſo that we have no real rhythm at all in our poetry: and

real

Fig. 1. Astronomical RING.

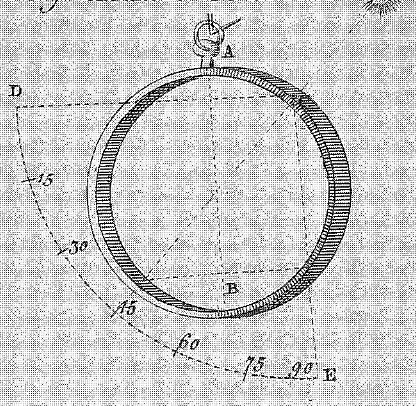


Fig. 2. The RING of a Roman Knight.

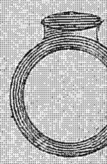


Fig. 3. ROMPEE.

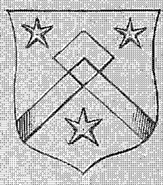


Fig. 4. RUSTRE.

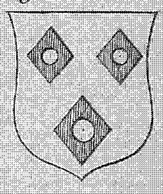
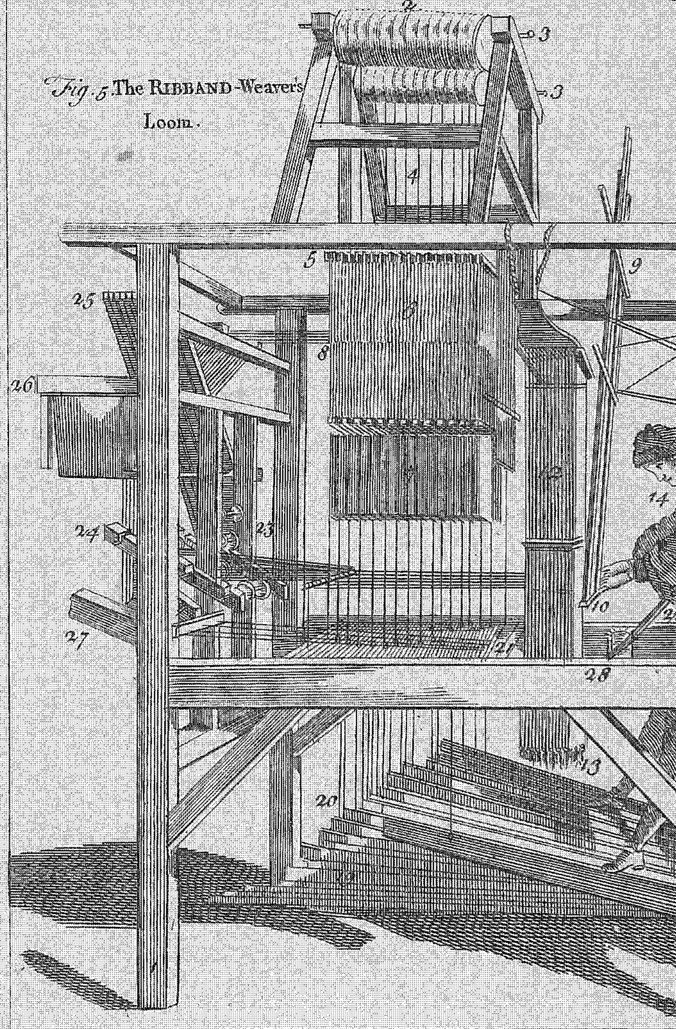
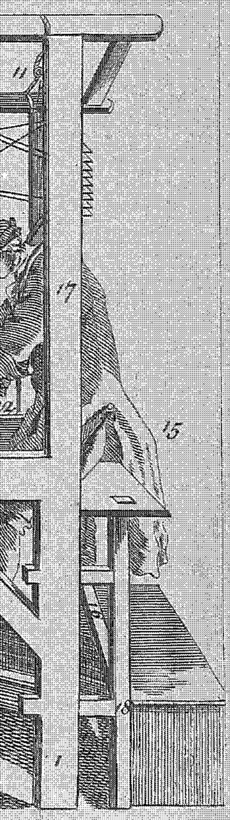


Fig. 5. The RIBBAND-Weaver's Loom.

T. Jefferys sculp

adds, that we mind nothing farther than to have ſuch a number of ſyllables in a verſe, in whatever nature, and in whatever order.

RHYTHMICA, ῥυθμικη, in the antient muſic, that branch which regulated the rhythm. See the preceding article.

The rhythmica conſidered the motions, regulated the meaſures, order, mixture, &c. ſo as to excite the paſſions, keep them up, augment, diminiſh, or allay them. Ariſtides, and other antient muſical writers, divided artificial muſic into harmonica, rhythmica, and metrica. See the article MUSIC. But the rhythmica with them likewiſe comprehended dumb motions, and, in effect, all rhythmical, *i. e.* regular motions.

RHYTHMOPOEIA, one of the antient muſical faculties, as they are called, which preſcribes rules for motion, or rhythm.

The antient rhythmopoeia is very defective: we find nothing of it in their books but ſome general hints, which can ſcarce be called rules. In their explications, there appears nothing but what belongs to words and verſes of their ſongs, which is a very ſtrong preſumption they had no other. See RHYTHM, and the preceding article.

RIAL, or RYAL, a ſpaniſh ſilver-coin. See the article COIN.

RIAL, or ROYAL, is alſo the name of a piece of gold, antiently current among us for ten ſhillings.

RIB, *coſta*, in anatomy. See RIBS.

RIBBAN, or RIBBON, in heraldry, the eighth part of a bend, like that repreſented in plate CCXXXII. fig. 8.

RIBBAND, or RIBBON, a narrow ſort of ſilk, chiefly uſed for head-ornaments, badges of chivalry, &c.

In order to give our readers an idea of the manner in which this curious and valuable branch of manufacture is managed, we ſhall preſent him with a view of the ribbon-weaver in his loom, as repreſented in plate CCXXXIII. fig. 5. where 1 is the frame of the loom. 2, The caſtle, containing forty-eight pullies. 3, The branches, on which the pullies turn. 4, The tires, or the riding-cords, which run on the pullies, and pull up the high-liſſes. 5, The lift-ſticks, to which the high-liſſes are tied. 6. The high-liſſes, or liſts, are a number of long threads, with platines, or plate-leads, at the bottom; and ringlets, or loops, about their middle, through which the cords or croſs-threads of the ground-harneſs ride, 7, The plate-leads, or platines, are flat pieces of lead, of about ſix inches long, and three or four inches broad at the top, but round at the bottom; ſome uſe black ſlates inſtead of them: their uſe is to pull down thoſe liſſes, which the workman had raiſed by the treddle, after his foot is taken off. 8, The branches or cords of the ground-harneſs, which go through the loops in the middle of the high-liſſes: on the well ordering of theſe cords chiefly depends the art of ribbon-weaving, becauſe it is by means of this contrivance that the weaver draws in the thread or ſilk that makes the flower, and rejects or excludes the reſt. 9, The batton; this is the wooden-frame that holds the reed, or ſhuttle, and beats or cloſes the work: where obſerve that the ribbon-weaver does not beat his work; but as ſoon as the ſhuttle is paſſed, and his hand is taken away, the batton is forced by a ſpring from the top, to beat the work cloſe. 10, The ſhuttle, or reed. 11, The ſpring of the batton, by which it is made to cloſe the work. 12, The long-harneſs are the front-reeds, by which the figure is raiſed. 13, The linguas are the long pieces of round or ſquare lead, tied to the end of each thread of the long-harneſs, to keep them tight. 14, The broad piece of wood, about a foot ſquare, leaning ſomewhat forward, intended to eaſe the weaver, as he ſtoops to his ſhuttle; it is fixed in the middle of the breaſt-beam. Some weavers, inſtead of this, have a contrivance of a cord or rope, that is faſtened to the front-frame, and comes acroſs his breaſt; this is called a ſlopfall. 15, The ſeat-bench; this leans forwards very much. 16, The foot-ſtep to the treddles. 17, The breaſt-beam, being a croſs-bar that paſſes from one of the ſtandards to the other, ſo as to front the workman's breaſt: to this breaſt-bar is fixed a roll, upon which the ribbon paſſes in its way to be rolled upon the roller, that turns a little below. 18, The clamps, or pieces of wood, in which the broaches, that confine the treddles, reſt. 19, The treddles are long narrow pieces of wood, to the ends of which the cords, that move the liſſes, are faſtened. 20, The treddle-cords are only diſtinguiſhed from the riding-cords by a board full of holes, which divide them, in order to prevent the plate-leads, which are tied to the high-liſſes, from pulling them too high, when the workman's foot is off the treddle: which ſtop is made by a knot in the treddle-

cord

cord, too big to be forced through that hole in the board. 21, The lames are two pieces of thin narrow boards, only uſed in plain works, and then to ſupply the place of the long-harneſs. 22, The knee-roll, by which the weaver rolls up his ribbon, as he ſees proper, or by bit and bit, as it is finiſhed. 23, The back-rolls, on which the warp is rolled. It is to be obſerved, that there are always as many rolls as colours in the work to be wove. 24, The clamps, which ſupport the rollers. 25, The returning-ſticks, or, as others call them, the returns, or the tumblers, or pullies, to which the tires are tied, to clear the courſe of cords through the high-liſſes. 26, The catch-board, for the tumblers. 27, The tire-board. 28, The buttons for the knee-rolls and treddle-board, deſcribed in number 20.

Ribbands of all ſorts are prohibited to be imported.

RIBBAND-SCREW-SHELL, a ſpecies of turbo, with broad ſpiral faſciæ, and a ſmall mouth. See the article TURBO.

RIBBLE, a river which riſes in the weſt-riding of Yorkſhire, and, running ſouth-weſt croſs Lancaſhire, falls into the Iriſh channel, below Preſton.

RIBES, in botany, a genus of the *pentandria-monogynia* claſs of plants, the corolla whereof conſiſts of five ſmall, obtuſe, erect petals, inſerted into the margin of the cup: the fruit is a globoſe, umbilicated berry, containing only one cell, with two lateral, oppoſite, longitudinal receptacles; the ſeeds are numerous, roundiſh, and ſomewhat compreſſed.

This genus comprehends the currant, the black currant, and the purple gooſeberry.

RIBESIUM, in botany, the ſame with the ribes. See the preceding article.

RIBS, *coſtæ*, in anatomy, certain long arched bones, ſerving to form or ſuſtain the inner ſides of the thorax. See the article THORAX.

The ribs are twenty-four in number, twelve on each ſide; their figure is an imperfect ſegment of a circle; their ſize is very different, the middle ones being largeſt, and the upper and lower much ſmaller: they are harder, rounder, and more incurvated towards their articulations with the vertebræ, than at the other extremity towards the ſternum, which is thinner, broader, and more ſpongy. The ribs are diſtinguiſh'd into true and ſpurious; the true ribs are the ſeven upper pair, which are thus diſtinguiſhed, as forming the moſt perfect arches, and as having a ſtrong articulation with the ſternum. The five lower are called nothæ, or ſpurious ribs, as being ſmaller, ſhorter, and more cartilaginous than the reſt, and not reaching ſo far as the ſternum, which make their articulations very lax, in regard they terminate in long ſoft cartilages, which, bending upwards, are joined to the upper ribs. The ſeveral ribs have been diſtinguiſhed by many authors, each under its peculiar name; but this is not neceſſary, as they are as eaſily known by the names firſt, ſecond, *&c.* On the inſide of the true ribs, except the loweſt, and ſometimes the next to it, runs a pretty deep ſinus, reaching from the end next the ſpine, almoſt to its junction with the cartilage. In the anterior extremities the cartilages of the ſeven true ribs are all joined to the ſternum; the eighth, ninth, and ſometimes the tenth, cohere either with the ſternum, or mutually adhere to one another, by means of their tranſverſe cartilages. The anterior extremities of all the others are looſe and free, between the muſcles of the abdomen and the diaphragm. In the poſterior extremities there are in moſt of them two capitulæ, or heads, which are firmly joined to the vertebræ of the back, yet ſo as to form moveable articulations; for the uſe of which, ſee the article RESPIRATION.

The ribs are liable both to fractures and luxations. In a ſlight fracture, the ſeparated bones are to be put into their places, a compreſs diped in ſpirit of wine is to laid on, and then covered with ſplints and a circular bandage. If any ſharp pieces of the ribs ſhould pierce the pleura, *&c.* it will be proper to open the ſkin, and extract the fragment. The ribs are but ſeldom diſlocated; but when this happens, they are to be replaced as ſoon as poſſible. See FRACTURE and LUXATION.

RICCIA, in botany, a genus of the *cryptogamia-algarum* claſs of plants, conſiſting of a foliaceous matter, procumbent on the ground, on which there are evident male and female fructifications, ſometimes both on the ſame, and ſometimes on different plants of the ſame ſpecies; the male flower has neither calyx nor corolla, but conſiſts of a ſingle anthera, of an oblong tubulated form, which grows to the leaves, without any pedicle: the female flower has no corolla, and ſcarce any calyx, it conſiſts principally of a pericarpium of a globular figure, in which

which there are contained a number of ſeeds.

RICE, *oryza*, in botany and medicine. See ORYZA.

RICHLIEU, a town of France, in the province of Orleanois and territory of Poictou, ſituated twenty-ſix miles north of Poictiers.

RICHMOND, a village in the county of Surry, ten miles weſt of London, formerly the reſidence of the kings of England.

RICHMOND is alſo a borough-town of Yorkſhire, thirty-three miles north-weſt of York.

It ſends two members to parliament.

RICINOCARPOS, in botany, the ſame with the mercurialis. See MERCURIALIS.

RICINOCARPOS is alſo the name whereby ſome call the acalypha. See the article ACALYPHA.

RICINOIDES, in botany, the ſame with the croton. See CROTON.

RICINUS, in botany, a genus of the *monoecia-polyadelphia* claſs of plants, having no corolla, the fruit is a roundiſh triſulcated capſule, conſiſting of three valves, and containing three cells; the ſeed is ſingle, and of a roundiſh figure.

RICKETS, *rhachitis*, in medicine, a diſorder incident to children, proceeding from an unequal nutrition.

Children are ſeldom attacked with rickets before they are nine months old, and after they are two years old. It may originally proceed from the diſorders of the parents, and may be increaſed by thoſe of the nurſe. It is alſo promoted by feeding the child with aqueous and mucous ſubſtances, crude ſummer-fruits, fiſh, and too great a quantity of ſweet things; by ſitting too much, eſpecially in a perforat-chair, with its coats up; by a ſtriking in of the itch, *&c.*

This diſorder is known from a flaccid tumour of the head and face, a flabby-looſe ſkin, a ſwelling of the belly, and a falling away of the reſt of the other parts, eſpecially of the muſcles; from protuberances of the apophyſes of the joints, ſuch as the wriſts, ancles, and knees; from the largeneſs of the jugular veins and arteries, while the reſt decreaſe; from knotty ribs, a narrow breaſt, and carious teeth, *&c.*

The cure, according to Boerhaave, is to be attempted with light, nouriſhing, dry aliment; not fat, but ſeaſoned, and taken often; with little ſound drink, ſuch as mild beer, or ale; with a dry warm air, and warm woolen clothing; with being carried about in the arms, or drawn in a vehicle over the ſtones, and often ſhook, ſwung, and put in motion; with repeated frictions, eſpecially of the belly and ſpine of the back with warm dry flannel, ſprinkled with aromatics; with gentle emetics, frequently tho' prudently repeated; with ſtrengthening purges for ſeveral days ſucceſſively; and with cold bathing, the child being put to ſweat between blankets every day, as ſoon as he comes out of the water.

Particularly for food, the bread ſhould be biſcuit, with a little ſaffron and ſpices; the fleſh ſhould be pigeons, pullets, veal, rabbits, mutton gently roaſted, minced and mixed with biſcuit, ſalt, a little parſley, thyme, nutmeg, or the like. He may alſo eat rice, millet, or pearl-barley, boiled with raiſins, to which add a little wine and ſpice. The drink may be red wine, of which an ounce may be given three or four times a day; as alſo brunſwic mum and engliſh beer, which, in the ſummer, may be mixed with ſpaw-water. Let the pillow and bed be filled with the following leaves dried in the ſhade, *viz.* of male-fern, three pounds; of marjoram, baum, and mint, each two handfuls; and of the flowers of melilot, ſweet-trefoil, elder, and roſes, dried in the ſhade, of each two ounces: reduce them all to powder, and mix them with double the quantity of barley-chaff.

RIDE, in the ſea-language, is a term variouſly applied: thus, a ſhip is ſaid to ride, when her anchors hold her faſt, ſo that ſhe does not drive, by the force either of the wind or tide. A ſhip is ſaid to ride acroſs, when ſhe rides with her fore and main yards hoiſted up to the hounds, and both yards and arms topped alike. She is ſaid to ride well, when ſhe is built ſo as not to over-beat herſelf in a head-ſea, the waves over-raking her from ſtem to ſtern. To ride athwart, is to ride with her ſide to the tide. To ride betwixt wind and tide, is to ride ſo as the wind has equal force over her one way, and the tide the contrary way. If the wind has more power over the ſhip than the tide, ſhe is ſaid to ride wind-round, or to ride a great wind. And ſhe is ſaid to ride a-portoiſe, when the yards of a ſhip are ſtruck down upon the deck. For to ride hawſefull, a-peek, or land-locked, ſee HAWSES, PEEK, and LANDLOCKED.

RIDE, of hazel, or other wood, is a cluſter of ſprigs ſhooting out from the ſame root.

RIDEAU, in fortification, is a ſmall elevation of earth, extending lengthwiſe on a plane, and ſerving to cover a camp, or to give an advantage to a poſt. Rideaus are alſo convenient for thoſe who would beſiege a place, and ſerve to ſecure the workmen in their approaches to the foot of a fortreſs.

Rideau is alſo uſed ſometimes for a trench, the earth of which is thrown upon its ſides, to ſerve as a parapet for covering the men.

RIDER, a term uſed for an after-clauſe added to a bill, while depending in parliament.

RIDER-ROLL. See the article ROLL.

RIDERS, in a ſhip, are large timbers, both in the hold and aloft, bolted on to other timbers to ſtrengthen them, when the ſhip is diſcovered to be too ſlightly built.

Out-RIDERS. See OUT-RIDERS.

RIDGE, in agriculture, a long piece of riſing land, between two furrows.

Mr. Tull obſerves, that the method of ploughing lands up into ridges is a particular kind of tillage, the chief uſe of which is the alteration it makes in the degrees of heat and moiſture. But the principal advantage this gentleman propoſes from ridges is the draining wet hills, where the upper ſtratum is mould, and the ſecond ſtratum clay. Theſe ridges, he obſerves, ſhould be plowed acroſs the hill, almoſt horizontally, that their parting furrows lying open, may each ſerve as a drain to the ridge next below it; for when the plough has made the bottom of theſe horizontal furrows a few inches deeper than the ſurface of the clay, the water will run to their ends very ſecurely, without riſing into the mould, provided no part of the furrows be lower than their ends. Theſe ridges and their parting furrows muſt be made more or leſs oblique, according to the form and declivity of the hill; but the more horizontal they are, the ſooner the rain-water will run off the lands: for in that caſe, it will run to the furrows, and reach them at right angles. Every one of theſe horizontal trenches receives all the water from the rills, or little gutters, which in theſe quagmire-hills, run betwixt the mould and the clay; theſe are all cut off by the trenches, which receive the water at their upper ſides, and carry it away, as the gutters of lead, placed under the eaves of a houſe, carry away the rain-water.

Theſe ridges ſhould be plowed in pairs, without throwing any earth into the trenches; and at every time of plowing, the pairs muſt be changed, ſo that the furrow which had two ridges turned towards it one time, muſt have two turned from it the next.

RIDGE, in building, the higheſt part of the roof or covering of a houſe.

RIDGES *of a horſe's mouth*, are wrinkles or riſings of fleſh in the roof of the mouth, running a-croſs from one ſide of the jaw to the other, with furrows between them. On the third or fourth of theſe ridges the farriers ſtrike with a horn, in order to bleed a horſe, whoſe mouth has been over-heated.

RIDGLING, or RIDGEL, among farriers, *&c.* the male of any beaſt that has been but half gelt.

RIDICULE, in matters of literature, is that ſpecies of writing, which excites contempt with laughter.

The objects of ridicule are falſhood, incongruity, impropriety, or turpitude of certain kinds: but as the object of every excited paſſion muſt be examined by reaſon, before we can determine whether it be proper or improper; ſo ridicule muſt, apparently at leaſt, eſtabliſh the truth of the improprieties, deſigned to excite the paſſion of contempt. Hence, it comes in to the aid of argument and reaſon, when its impreſſions on the imagination are conſiſtent with the nature of things; but when it ſtrikes the fancy and affections with fictitious images, it becomes the inſtrument of deceit. But however ridicule may impreſs the idea of apparent turpitude, or falſhood, in the imagination; yet ſtill reaſon remains the ſupreme judge: and thus ridicule can never be the final teſt or touch-ſtone of truth and falſhood, as has been obſerved by lord Shafteſbury.

RIDING, a diviſion of Yorkſhire, of which there are three, *viz.* the eaſt, weſt, and north ridings.

In all indictments in that county, both the town and riding muſt be expreſſed.

RIDING-CLERK, one of the ſix clerks in chancery, who, in his turn, annually keeps the controlment-books of all grants that paſs the great ſeal that year.

RIENS ARREAR, in law, is a plea uſed in an action of debt, for arrearages of accounts, by which the defendant alledges, that there is nothing in arrear.

RIENS PASSE PAR LE FAIT, NOTHING PASSES BY THE DEED, is the form of an exception, in ſome caſes taken to an action. See EXCEPTION.

RIENS PAR DESCENT, NOTHING BY DESCENT, is the plea of an heir, ſued for his anceſtor's debt, though he has no lands from him by deſcent, nor aſſets in his hands. See DESCENT.

RIER, or REER-COUNTY, in law, is oppoſed to full and open county, and, in our ſtatutes, is taken to be ſome public place appointed by the ſheriff, for the receipt of the king's money, after the end of the county-court.

RIES, a town of Provence, in France, twenty-ſeven miles north-eaſt of Aix.

RIETI, a town of Italy, in the territory of the pope and dutchy of Spoletto, ſixty-three miles eaſt of Rome.

RIEUX, a town of France, in the province of Languedoc, twenty-two miles ſouth of Toulouſe.

RIGA, a port-town of Livonia, one of the beſt harbours and trading towns in the Baltic: eaſt lon. 24°, north lat. 57°.

RIGADOON, a gay and briſk dance, borrowed originally from Provence in France, and performed in figure, by a man and a woman.

RIGEL, the ſame with regel. See the article REGEL.

RIGGING *of a ſhip*, is all her cordage and ropes, belonging to her maſts, yards, *&c.* See SHIP, ROPE, CORDAGE, *&c.*

A ſhip is ſaid to be well rigged, when all her ropes are of a fit ſize and proportion: and ſhe is ſaid to be over-rigged, when her ropes are too large; which is of great prejudice to her ſailing, and is apt to make her heel.

RIGHT, in geometry, ſignifies the ſame with ſtraight: thus, a ſtraight line is called a right one. See LINE.

As for right angle, right aſcenſion, right cone, right deſcenſion, right line, right ſphere, *&c.* they are explained under the articles ANGLE, ASCENSION, *&c.*

RIGHT, *jus*, in law, not only denotes property, for which a writ of right lies, but alſo any title or claim, either by virtue of a condition, mortgage, *&c.* for which no action is given by law, but an entry only. See JUS, ENTRY, PROPERTY, *&c.*

By ſtat. 1 Will. & Mar. cap. ii. the following particulars relating to the ill conduct of king James II. were declared to be illegal, and contrary to the antient rights and liberties of the people, *viz.* his exerciſing a power of diſpenſing with, and ſuſpending, of laws; his levying money without conſent of parliament; violating the freedom of elections; cauſing partial and corrupt jurors to be returned on trials, exceſſive bail to be taken, and exceſſive fines to be impoſed, as well as cruel puniſhments to be inflicted, *&c.*

RIGIDITY, in phyſics, denotes a brittle hardneſs. See the article HARDNESS.

It is oppoſed to ductility, malleability, and ſoftneſs. See DUCTILITY, *&c.*

RIGLET, or REGLET. See REGLET.

RIGNANO, or REGUANO, a town of Italy, in the territories of the pope and St. Peter's patrimony, fifteen miles north of Rome.

RIGOL, a kind of muſical inſtrument, conſiſting of ſeveral ſticks bound together, only ſeparated by beads. It makes tolerable muſic, on being well ſtruck with a ball at the end of a ſtick.

RIGOR, in medicine, a convulſive ſhuddering, from ſevere cold, an ague-fit, or other diſorder.

RIM, in a watch, or clock, the edge or border of the circumference or circular part of a wheel.

RIME, or RHYME, in poetry. See the article RHYME.

RIMINI, a port-town of Italy, in the territories of the pope, and province of Romania, ſituated on the gulph of Venice: eaſt lon. 13° 30′, and north lat. 44° 8′.

RIND, the ſkin of any fruit that may be cut off or pared.

The outer coat of the cheſnut, ſet with prickles, is particularly termed the urchin-like rind.

Rind is alſo uſed for the inner bark of trees or that whitiſh ſoft ſubſtance which adheres immediately to the wood.

In the modern theory of vegetation, the ſap is ſuppoſed to paſs through the rind, in its return from the extremities of the branches to the root. Others ſuppoſe its veſſels to do the office of arteries, whence Mr. Bradley call them arterial veſſels.

RING, an ornament of gold, ſilver, *&c.* made of a circular form, and generally worn on the finger. That worn by the antient roman knights is repreſented in plate CCXXXIII. fig. 2.

Nuptial or wedding rings were uſed by the antient Greeks and Romans; and from them the chriſtians took them up very early, as appears from Tertullian, and ſome antient liturgies, where we find

the form of bleſſing the nuptial ring. See MARRIAGE and NUPTIAL.

The epiſcopal ring is alſo of very antient ſtanding; it makes a part of the pontifical apparatus, and is eſteemed a pledge of the ſpiritual marriage between the biſhop and his church.

There is ſcarcely any part of the body on which rings have not been worn. In India, the people commonly wear them on the noſe, lips, cheeks, and chin. As to the ears, the cuſtom ſtill obtains of wearing rings in them, both by men and women, throughout the greateſt part of the world. When Peter Alvarez had his firſt audience of the king of Calicut, he found him covered with ſtones ſet in rings, both on his hands, fingers, feet, and toes: and Louis Bartome repreſents a king of Pegu with precious ſtones on every toe.

Rings have alſo been uſed as ſeals. See the article SEALS.

RING, in navigation and aſtronomy, a braſs-inſtrument, made in the form of a ring, and ſerving to take altitudes of the ſun. See plate CCXXXIII. fig. 1.

At C is a ſmall hole, in the direction CD, which is perpendicular to CE; this hole is preciſely 45° from A, and CE is parallel to the vertical diameter AB. From C, as a center, they deſcribe a quadrant of a circle CED; which being nicely divided into 90°, they mark upon the internal ſurface of the ring the places where rays, drawn from C, to theſe degrees, cut the ſaid ſurface.

To uſe this ring, they hold it up by the ſwivel, and turn the ſide with the hole C, towards the ſun; and then the ſun-beams paſſing through the hole, make a luminous ſpot among the degrees, whereby the altitude is found. Some prefer the ring to the aſtrolabe, by reaſon its diviſions are larger: however, it is far from being exact enough to be much depended on in aſtronomical obſervations, which are better made by quadrants. See ASTROLABE and QUADRANT.

RING-BONE, in farriery, a hard callous ſubſtance, growing in the paſtern of a horſe, above the coronet: it is thus called from its growing quite round like a ring.

RING-DIAL. See the article DIAL.

RING-OUZEL, in ornithology, a ſpecies of black turdus, with a white ring, a little larger than the common black-bird. See the article TURDUS.

RING-WORM, in medicine, the ſame with the ſerpigo. See the article SERPIGO.

Fairy-RING, or CIRCLE. See FAIRY.

Saturn's RING, in aſtronomy. See the article SATURN.

RINGWOOD, a market-town of Hampſhire, twenty-five miles ſouth-weſt of Wincheſter.

RIO GRANDE, a river of Terra Firma, which, riſing almoſt under the equator, and running north, falls into the north ſea between Carthagena and St. Martha.

RIO GRANDE is alſo a river of Africa, which runs from eaſt to weſt through Negroland, and falls into the Atlantic ocean, in 11° north latitude.

RIO JANEIRO, a river of ſouth America, which riſes in the mountains weſt of Brazil, and falls into the Atlantic ocean almoſt under the tropic of capricorn.

RIONDO, in ichthyology, a ſpecies of red zeus, with an even tail, and the roſtrum turned upwards. See ZEUS.

RIOM, a town of the Lionois, in France, ſeven miles north of Clermont.

RIOT, in law, is where three or more perſons, aſſembled together, commit ſome unlawful act, with force and violence, to the diſturbance of the peace; as beating ſome perſon, forcibly entering upon the poſſeſſion of the lands, houſes, *&c.* of another, or breaking down incloſures, houſes, *&c.*

By ſtat. 1 Geo. I. cap. v. if any perſons to the number of twelve or more, unlawfully and riotouſly aſſembled, continue together for an hour, after being required, by a juſtice of the peace, or other magiſtrate, to diſperſe, they ſhall be deemed guilty of felony without benefit of clergy. However, proſecutions upon this ſtatute, muſt be begun within one year after the offence is committed.

RIPAILLE, a town of Savoy, ſituated on the ſouth ſide of the lake of Geneva, twenty miles north-eaſt of that city.

RIPEN, a city and port-town of north Jut'and, ſubject to Denmark.

RIPENERS, in ſurgery, medicines that promote ſuppuration, otherwiſe called ſuppuratives. See SUPPURATIVES.

RIPPON, a borough-town of Yorkſhire, twenty-one miles north-weſt of York. It ſends two members to parliament.

RISING, *ortus*, in aſtronomy, the appearance of the ſun, a ſtar, *&c.* above the horizon of any place.

There are three kinds of poetical riſing of the ſtars, *viz.* acronycal, coſmical, and heliacal. See ACRONYCAL, *&c.*

The

The heavenly bodies always appear above the horizon before they really arrive at it, on account of refraction. See the article REFRACTION.

RISK, or HAZARD, in gaming, *&c.* See the articles CHANCE, HAZARD, *&c.*

RITE, *ritus*, among divines, denotes the particular manner of celebrating divine ſervice, in this or that country. See the article RITUAL.

RITORNELLO, or REPEAT, in muſic, the burden of a ſong, or the repetition of the firſt or other verſes of a ſong at the end of each ſtanza or couplet.

Cuſtom has extended the uſe of the word to all ſymphonies played before the voices begin; and which ſerve by way of prelude to what follows.

In the partitions of the ſcore of the italian muſic, we frequently find the ritornellos ſignified by the words *ſi ſuona*, to ſhew that the organ, ſpinet, harpſichord, or the like, are to repeat ſome bars of what the voice has been ſinging. See the article REPETITION.

RITUAL, a book directing the order and manner to be obſerved in celebrating religious ceremonies, and performing divine ſervice in a particular church, dioceſe, order, or the like.

The antient heathens had alſo their rituals, which contained their rites and ceremonies to be obſerved in building a city, conſecrating a temple or altar, in ſacrifiſing, deifying, *&c.*

RIVA, a city of Italy, at the north end of the Lake de Garda, ſixteen miles ſouth-weſt of Trent.

RIVADEC, a city and port of Spain, in the province of Galicia; weſt long. 7° 10′, north lat. 43° 36′.

RIVAL, a term applied to two or more perſons, who have the ſame pretenſions, and which is properly applied to a competitor in love, and figuratively to an antagoniſt in any other purſuit.

RIVER, *fluvius*, or *flumen*, a current, or ſtream of freſh water flowing in a bed or channel, from its ſource into the ſea. See the article SPRING.

The great, as well as the middle-ſized rivers, proceed either from a confluence of brooks and rivulets, or from lakes; but no river of conſiderable magnitude flows from one ſpring, or one lake, but is augmented by the acceſſion of others. Thus the Wolga receives above two hundred rivers and brooks before it diſcharges itſelf into the Caſpian Sea; and the Danube receives no leſs, before it enters the Euxine Sea. Some rivers are much augmented by frequent rains, or melted ſnow. In the country of Peru, and Chili, there are ſmall rivers, that only flow in the day; becauſe they are only fed by the ſnow upon the mountains of the Andes, which is then melted by the heat of the ſun. There are alſo ſeveral rivers upon both ſides the extreme parts of Africa, and in India, which for the ſame reaſon are greater by day than by night. The rivers alſo in theſe places are almoſt dried up in ſummer, but ſwell and overflow their banks in winter, or in the wet ſeaſon. Thus the Wolga in May and June is filled with water, and overflows its ſhelves and iſlands, though at other times of the year it is ſo ſhallow, as ſcarcely to afford a paſſage for loaded ſhips. The Nile, the Ganges, the Indus, *&c.* are ſo much ſwelled with rain or melted ſnow, that they overflow their banks; and theſe deluges happen at different times of the year, becauſe they proceed from various cauſes. Thoſe that are ſwelled with rain, are generally higheſt in winter, becauſe it is uſually then more frequent than at other times of the year; but if they proceed from ſnow, which in ſome places is melted in the ſpring, in others, in ſummer, or between both, the deluges of the rivers happen accordingly. Again, ſome rivers hide themſelves under-ground, and riſe up in other places, as if they were new rivers. Thus the Tigris meeting with mount Taurus, runs under it, and flows out at the other ſide of the mountain: alſo, after it has run thro' the lake Toſpia, it again immerges, and being carried about eighteen miles under-ground, breaks out again, *&c.*

The channels of rivers, except ſuch as were formed at the creation, Varenius thinks, are artificial. His reaſons are, that, when a new ſpring breaks out, the water does not make itſelf a channel, but ſpreads over the adjacent land; ſo that men were neceſſitated to cut a channel for it, to ſecure their grounds. He adds, that a great number of channels of rivers are certainly known from hiſtory to have been dug by men.

The water of moſt rivers flow impregnated with particles of metals, minerals, *&c.* Thus ſome rivers bring ſands intermixed with grains of gold; as in Japan, Peru, and Mexico, Africa, Cuba, *&c.* particularly in Guinea is a river, where the negroes ſeparate the gold duſt from

from the ſand, and ſell it to the Europeans, who traffic thither for that very purpoſe. The Rhine in many places is ſaid to bring a gold mud. As to rivers that bring grains of ſilver, iron, copper, lead, *&c.* we find no mention of them in authors; though, doubtleſs there are many, and it may be to them that mineral waters owe many of their medicinal virtues. See the article MINERAL.

Theory of the motion of RIVERS. The running of rivers is upon the ſame principle as the deſcent of bodies on inclined planes; for water no more than a ſolid can move on an horizontal plane, the re-action of ſuch a plane being equal and contrary to gravity, entirely deſtroys it, and leaves the body at reſt: here we ſpeak of a plane of ſmall extent, and ſuch as coincides with the curved ſurface of the earth. But if we conſider a large extent or long courſe of water, then we ſhall find that ſuch water can never be at reſt, but when the bottom of the channel coincides every where with the curved ſurface of the earth.

Let ADF (plate CCXXXIV. fig. 1. n° 1.) be the curved ſurface of the earth, C its centre, CD, CE two right lines drawn from thence, and EG a tangent to the earth in the point D. Then it is plain if BD were a channel of water, the water could not run, or move, becauſe they are every where at an equal diſtance from the center C, and therefore equally affected by gravity. But if there be any place above the ſurface of the earth, as E, where water can be found, 'tis evident that water can deſcend in a channel to any part of the earth's ſurface between B and D, becauſe every point in the line ED is nearer to the center of the earth, and therefore below the point or place E; and its velocity will be ſo much the greater as it tends to a point nearer B, and ſloweſt of all, when it moves in the direction of the tangent ED. See FLUID.

Hence it appears that the ſource E of all rivers and ſtreams muſt be more than a ſemi-diameter of the earth CB diſtant from the center C. And ſince all great rivers run to the ſea or ocean where they diſembogue their waters at the point D, the line DC is a ſemidiameter, and = 4000 miles nearly. Alſo the courſe of all long rivers being in the direction of the tangent at the point D, if they were repreſented by the tangent-line EG, then the height of the ſource E above the common ſurface of the earth at B would be eaſily found. Thus, ſuppoſe ED were the river Niger in Africa, whoſe ſource is more than 3000 miles from the ſea; but put ED = 3000, and ſince CD = 4000, we ſhall have CE = 5000, and CE − CB = 1000 = BE = the height of the ſource. But ſince we know of no mountains above three or four miles high, it is plain the river Niger, and all ſuch long rivers, are ſo far from moving in a tangent, that their courſe muſt be very nearly of the ſame curvature with the earth's ſurface, and inſenſibly diſtant from it.

Since bodies move on planes ever ſo little inclined, except ſo far as they are prevented by friction, and ſince the friction of the particles of water among themſelves is inconſiderable, it follows that the water ſituated on a plane ever ſo little inclined, will commence a motion; and if the plane be conſiderably inclined, and the quantity of water great, its velocity will be proportional, and its momentum ſuch as will ſoon begin to wear away the earth, and create itſelf a courſe or channel to glide in. In rivers that are made, it is uſual to allow the fall of one foot in 300.

If we allow the ſame declivity to rivers which make their own way, then we find their height at their ſource above the common ſurface of the ſea, as in example of the Niger thus: As 300 : 1 :: 5280 : $\frac{5280}{300}$ = the height at one mile, or 5280 feet. Then again ſay, as 1 : $-\frac{5280}{300}$ :: 3000 : $\frac{5280 \times 3000}{300} = 5280 \times 10 = 10$ miles.

From whence it is evident, that the continents and iſlands ought to be much above the ſurface of the ſea, to give a neceſſary deſcent and courſe to the waters through them.

Let ABCD (*ibid.* n° 2.) be the ſection of a reſervoir, and BCIK the ſection of a canal of water ſupplied from thence, and ABN the horizontal line. Now, ſince the particles of water are governed by the common laws of gravity, the velocity of a particle at any part of the bottom of the canal, as F or H, will be the ſame as it would acquire by falling through the perpendicular altitude OF or LH, that is, as $\sqrt{OF}$ to $\sqrt{LH}$. Hence the velocity of the ſtream is accelerated.

For

For the ſame reaſon the velocity of a particle at the bottom of the ſtream H is to the velocity of a particle at the top G, as $\sqrt{LH}$ to $\sqrt{MG}$; conſequently the ſtream moves with a greater celerity at bottom than at top.

The quantity of the water which paſſes through the ſection of the ſtream H G, is the ſame that paſſes through the ſection of the reſervoir B C in the ſame time. The ſame may be ſaid of any other ſection F E; therefore the quantity of water, paſſing by any two ſections of the ſtream FE and GH, in the ſame time, is the ſame.

Since there runs the ſame quantity of water by G H as by F E in the ſame time; and ſince the velocity at G H is greater than at F E; and, laſtly, ſince the breadth of the canal is ſuppoſed to be every-where the ſame; therefore it follows, that the depth G H muſt be leſs than the depth F E, and ſo the depth of the ſtream muſt continually decreaſe as it runs.

As the ſtream proceeds, the depth H G decreaſing, the lines M G and L H will approach nearer to an equality; and therefore the different velocities of the water at top and bottom will approach much faſter to an equality, as being proportionate to the ſquare roots of thoſe lines. This approach to an equality is much farther promoted, by the upper parts being continually accelerated by the lower, and the lower parts retarded continually by the ſlower motion of the waters above, and preſſing upon them.

Since the difference of the deſcending velocities is greateſt near the head of the ſtream, the waters will there fall or deſcend with the greateſt impetuoſity, or cauſe the loudeſt noiſe. But in the courſe of rivers, the accelerated velocity is quickly reduced to an equable or uniform velocity, by the reſiſtance it meets with from the bottom and ſides of the channel, which reſiſtance will be as the ſquares of the velocities, and therefore ſoon become ſo great as to equal the accelerating force, and be communicated to the middle part of the ſtream, cauſing the whole to move uniformly. Hence, in rivers, the motion of the water is ſloweſt at the ſides and bottom of the channel, becauſe there the reſiſtance begins, which is afterwards communicated to all the other parts; and in different parts of the ſame river, the uniform velocity is greateſt, where the bottom of the channel has the greateſt inclination, or declivity, becauſe the relative gravity of the moving particles is here greateſt. Again, in thoſe parts of the river where the velocity of the ſtream is leaſt, the depth of the water is greateſt, and vice verſa, becauſe equal quantities paſs thro' unequal ſections of the river in the ſame time. Hence alſo it follows, that the momentum of running water muſt be every where the ſame, or a given quantity.

RIVULET, a diminutive of river. See the article RIVER.

RIVINIA, or RIVINA, in botany, a genus of the *tetrandria-monogynia* claſs of plants, without any flower petals: the fruit is a globoſe berry, containing a ſingle roundiſh and compreſſed ſeed.

RIX-DOLLAR, a ſilver-coin, current in different parts of Europe. See COIN.

ROACH, in ichthyology, a ſpecies of cyprinus, with the iris and belly-fins uſually red: it is generally, when full grown, nine inches long, but it ſometimes grows conſiderably larger. See the article CYPRINUS.

ROACHING *of alum*, is the laſt proceſs in making alum, which, being ſufficiently waſhed in a ciſtern of ſtrong alum-water, is put into large pans, and a quantity of water added to it; and then being ſet over the fire to melt, and boil a little, it is ſcooped into a great caſk, where it is ſuffered to ſtand and cryſtalize, and is what they call roach, roached, or rock alum. See ALUM.

ROAD, an open way, or public paſſage, forming a communication between one place and another.

Of all the people in the world the Romans took the moſt pains in forming roads, and the labour and expences they were at in rendering them ſpacious, firm, ſtrait, and ſmooth, is incredible. They uſually ſtrengthened the ground by ramming it, laying it with flints, pebbles or ſands, and ſometimes with a lining of maſonry, rubbiſh, bricks, &c. bound together with mortar. In ſome places in the Lionois, F. Meneſtrier obſerves, that he has found huge cluſters of flints cemented with lime, reaching ten or twelve feet deep, and making a maſs as hard and compact as marble, and which, after reſiſting the injuries of time for 1600 years, is ſtill ſcarce penetrable by all the force of hammers, mattocks, &c. and yet the flints it conſiſts of are not bigger than eggs. The moſt noble

of the roman roads was the Via Appia, which was carried to ſuch a vaſt length, that Procopius reckons it five days journey to the end of it, and Leipſius computes it at 350 miles: it is twelve feet broad, and made of ſquare free-ſtone, generally a foot and a half on each ſide; and though this has laſted for above 1800 years, yet in many places it is for ſeveral miles together as intire as when it was firſt made.

The antient roads are diſtinguiſhed into military roads, double roads, ſubterraneous roads, *&c.* the military roads were grand roads, formed by the Romans for marching their armies into the provinces of the empire; the principal of theſe roman roads in England, are Watling-ſtreet, Ikenild-ſtreet, Foſs-way, and Erminage-ſtreet. Double roads among the Romans, were roads for carriages, with two pavements, the one for thoſe going one way, and the other for thoſe returning the other: theſe were ſeparated from each other by a cauſeway raiſed in the middle, paved with bricks for the conveniency of foot paſſengers; with borders and mounting ſtones from ſpace to ſpace, and military columns to mark the diſtance. Subterraneous roads are thoſe dug through a rock, and left vaulted; as that of Puzzoli near Naples, which is near half a league long, and is fifteen feet broad, and as many high.

For the engliſh roads, ſee HIGHWAY.

ROAD, in navigation, is a place of anchorage at ſome diſtance from ſhore, where veſſels uſually moor, to wait for a wind or tide proper to carry them into harbour, or to ſet ſail.

When the bottom is firm, clear of rocks and ſheltered from the wind, it is called a good road; and when there is but little land on any ſide, it is termed an open road.

The roads in his majeſty's dominions are free to all merchant veſſels, belonging to his ſubjects and allies. Captains and maſters of ſhips who are forced by ſtorms, *&c.* to cut their cables, and leave their anchors in the roads, are obliged to fix marks or buoys, on pain of forfeiting their anchors, *&c.* Maſters of ſhips coming to moor in a road, muſt caſt anchor at ſuch a diſtance, as that the cables, *&c.* do not mix, on pain of anſwering the damages; and when there are ſeveral veſſels in the ſame road, the outermoſt to the ſea-ward is obliged to keep a light in his lanthorn in the night-time, to appriſe veſſels coming in from ſea.

ROADER, among ſailors, a ſhip that rides at anchor in a road.

ROAN. See the article ROUEN.

ROANE, a town of France, in the province of Lionois, forty miles north-weſt of Lyons.

ROANOAK, an iſland in north America, near the coaſt of Albemarle-county, in north Carolina: weſt long. 75°, north lat. 35° 40′.

ROASTING, in metallurgy, the ſeparation of volatile bodies from thoſe which are more fixed, by the combined action of air, and fire; and is generally the firſt proceſs in the ſeparation of metals from their ores: it differs from ſublimation only in this, that in this operation the volatile parts are diſſipated, when reſolved into vapours; whereas in that, they are preſerved. See SUBLIMATION. Sulphur and arſenic are in this manner collected, and preſerved, in the roaſting of many ores; and ſublimation made, as it were, occaſionally in the proceſs.

The ſeparation of the volatile parts of bodies, from the more fixed is, however, in many caſes very difficult, and much nicety is required in the conducting this operation; this is the caſe, for inſtance, when the whole compound body melts in almoſt the ſame degree of fire that is neceſſary to raiſe, and diſſipate the volatile parts in the air; in ſuch caſes, care muſt be taken, firſt previouſly to pound a little the body to be roaſted, that its ſurface contiguous to the air may be increaſed in extent. A gentle fire is alſo neceſſary on ſuch occaſions, and a very free acceſs of the air, which is the vehicle of theſe vapours. When the body in the roaſting grows on theſe occaſions into large lumps or clots, the ſurface of it muſt be reſtored to the neceſſary extent, by repeated poundings, for it is neceſſary above all things, that the matter be kept extended and recent, and never collected into a heap.

Roaſting, as commonly practiſed, is ſubject to many inconveniencies, which may be moſt of them eaſily remedied, and the whole buſineſs reduced to a few eaſy rules. 1. The roaſting of ores ſhould be always performed, without addition, when the ores are rich, or of itſelf merely of a metallic nature. But the additions of quicklime, pot-aſhes, iron-filings, and the like, are neceſſary, when arſenical, antimonial and ſulphureous matters are found

found to be mixed with the ores. 2. The fire is to be ſo regulated from the firſt, that only the lighter or more volatile ſulphureous or arſenic fumes may fly off, otherwiſe the more metallic part would likewiſe go, and without ſome contrivance to catch it would be loſt. The ore muſt, however, always feel the force of an open flame, otherwiſe the ſulphur, arſenic, *&c.* will never be thoroughly diſlodged. 3. The more theſe immature ſubſtances abound in ore, the gentler the fire ſhould be at firſt; and when the greater part of the ſulphureous matter is thus exhaled, the fire is then to be quickened. 4. Where ſuch additions are uſed, as are not metalline, as lime, mud, pot-aſh, *&c.* they ought always to be ſeparated afterwards from the matter before the fuſion, by waſhing.

ROB, in pharmacy, the juices of fruits purified and inſpiſſated till it is of the conſiſtence of honey.

Rob of alderberries is thus prepared: Take two quarts of the juice of ripe alderberries, and half a pound of refined ſugar. Evaporate over a gentle fire, or in a water-bath, till it is of a due conſiſtence.

ROBBERY, in law, a felonious taking away another man's goods, from his perſon, preſence, or eſtate, by putting him in fear.

Robbery on the highway, is felony without benefit of clergy, though the ſum or value taken be under twelve-pence, or even be no more than a ſingle penny: but if any thing be taken from the perſon of another without putting him in fear, this is properly no robbery, but felony, in which benefit of clergy is allowed; the putting in fear being the chief article that diſtinguiſhes robbery from ſtealing from a man's perſon.

In the caſe of robberies, there is therefore, a taking in deed, which is the very act; and a taking in law, as where a robber compels a man, from the fear of death, to ſwear he will bring him a ſum of money, which the ſworn perſon delivers to the other. The ſtreets in cities are made highways, in reſpect to robberies, by 6 Geo. I. Perſons who aſſault, or in a forcible manner demand money of another, with an intent to commit a robbery, are guilty of felony, and are to be tranſported for ſeven years.

The hundred in which a robbery on the highway is committed, is liable to pay the damage, when it is committed between the riſing and ſetting of the ſun, in any day, except Sunday, in caſe the robbers are not taken in forty days; hue and cry being made after the robber. And he who apprehends and proſecutes a robber on the highway, ſo as to convict him, is intitled to receive of the ſheriff of the county where the robbery was committed, the ſum of 40l. with the horſe, furniture, arms, *&c.* upon ſuch perſon's producing a proper certificate from the judge before whom the robber was convicted.

Houſe-ROBBING. See the article HOUSE-BREAKING.

ROBE, a garment of ſtate, being a kind of gown, which hangs looſe, and covers the whole body.

Maſter of the ROBES. See the article MASTER *of the Wardrobe*.

ROBERVALLIAN LINES, certain lines uſed for the tranſmutation of figures, and ſo called from their inventor M. de Roberval.

ROBIGALIA, or RUBIGALIA. See the article RUBIGALIA.

ROBINIA, in botany, a genus of the *diadelphia-decandria* claſs of plants, with a papilionaceous flower; its fruit is a large and long pod, of a compreſſed and gibboſe ſhape, and containing a few kidney-ſhaped ſeeds.

ROBORANTS, *roborantia*, in pharmacy, medicines which ſtrengthens the parts, and give new vigour to the conſtitution. See the article STRENGTHENERS.

ROCAMBOLES, in cookery, a mild kind of garlic, by ſome called ſpaniſh garlic. See the article GARLIC.

ROCELLA, in commerce, *&c.* the ſame with the alga tinctoria, uſed by the dyers for a purple colour. See the article ALGA.

ROCHDALE, a market-town, thirty-two miles ſouth-eaſt of Lancaſter.

ROCHEFOUCAUT, a town of Orleanois, in France, fifteen miles eaſt of Angouleſme.

ROCHELLE, a city and port-town of Orleanois, in France: weſt long. 1° 5′, north lat. 46° 7′.

ROCHESTER, a city of Kent, ſituated on the river Medway, thirty miles eaſt of London, and twenty two weſt of Canterbury.

Roceſter bridge, over the Medway, makes a much finer appearance than London bridge, there being no houſes

on it, and an iron paliſade running its whole length on each hand.

ROCHFORD, a market-town of Eſſex, thirty-three miles eaſt of London, and fifteen ſouth-eaſt of Chelmsford.

ROCHFORT, a port-town of Guienne, in France, twenty-three miles ſouth of Rochelle: weſt long. 1°, north lat. 46°. It is one of the ſtations of the french navy, having a commodious harbour, well ſecured by forts and batteries.

ROCKET, in pyrotechny, an artificial fire work, conſiſting of a cylindrical caſe of paper, filled with a compoſition of certain combuſtible ingredients; which, being tied to a ſtick, mounts into the air, to a conſiderable height, and there burſts.

Rockets make a conſiderable part of all fire-works of entertainment; being not only uſed ſingly, but alſo as an ingredient in others.

The rocket, above defined, is properly the ſky-rocket; the method of making which, is this. 1. A concave cylindrical mould, AB (plate CCXXXIV. fig. 2. n° 1.) is turned of hard wood, with a baſe BD, and a capital HC, uſually adorned with ſuitable mouldings. This cylinder muſt be open at both ends, and its dimenſions, for rockets of various ſizes, as in the following article. When large, it is ſometimes alſo made of braſs or tin; and when ſmall, of bone. 2. Of the ſame matter with the cylinder, is prepared a quadra, or foot ME; in the middle of which is turned a hemiſphere GO, conſiderably leſs than the cavity of the cylinder; making the cap or head of another cylinder IK, and reaching up within the caſe, where it is kept ſteady by a pin LM.

Authors do not agree about the proportions.—Simionowitz preſcribes thoſe that follow: if the diameter of the aperture HN be equal to that of a leaden ball of a pound, or at moſt two pounds weight; the height of the cylinder, with the baſe and capital HC, to be ſeven diameters, and the heighth of the quadra FE $1\frac{1}{3}$. The altitude of the cylinder KI, 1. The diameter HN, $\frac{1}{2}\frac{2}{3}$. The diameter of the hemiſphere G, $\frac{2}{3}$. The heighth of the capital AC, 1. The ſame author adds, that he finds by abundant experience, that, if the diameter of the aperture be divided into 100 parts, according to the different weight of the leaden balls, to whoſe diameter it is equal, the following numbers, being multiplied by 7, give the heighth HE.

Weight of leaden ball.	Subſeptuple of altitude HE.
1	100
2	98
4	96
6	94
10	91
15	88
23	86
30	82
40	78
50	75
70	67
100	57

The mould being ready, a wooden cylinder or mould AB (*ibid.* n° 2.) is provided, whoſe diameter is $\frac{3}{4}$ of the aperture of the frame, and its length equal to the heighth of the ſame; to which is fixed a haft or hilt AD. About this mould is a thick ſtrong paper rolled, till ſuch time as it fills the cavity of the frame. This done, where the haft is joined to the cylinder, as at A, it is choaked, *i. e.* firmly bound round with fine pack-thread, ſo as to conſtringe or ſtraighten the cavity thereof. The part thus choaked or bound up FG (*ibid.* n° 3.) to be equal to the hemiſphere GO n° 1.

The caſe is now taken off the mould, and put into the cavity of the frame (n° 1.) the choak GF upon the hemiſphere; and in this diſpoſition is filled with a compoſition deſcribed in the following table, rammed ſtrongly in by means of a wooden cylinder, or rammer fitting the cavity, and a mallet.

When filled, a paper-cap of a conical form is glued over the end of the caſe filled laſt; and the ſpace left a-top filled with whole gunpowder, to the heighth of about one diameter; then the rocket bound, or choaked in E, as before in G.

Laſtly, the rocket is bored, as is repreſented in AL (n° 3.) care being taken to do it in the middle. Some, indeed, bore the rocket, as they fill it, by thruſting a long, ſharp ſpike through the lower baſis, and drawing it out again, when the rocket is full; but it is beſt not to bore till the rocket be uſed.

The boring is to go two thirds of the heighth of the rocket, abating one diameter of the cavity. The diameter of the

Fig. 1. Motion of RIVERS.

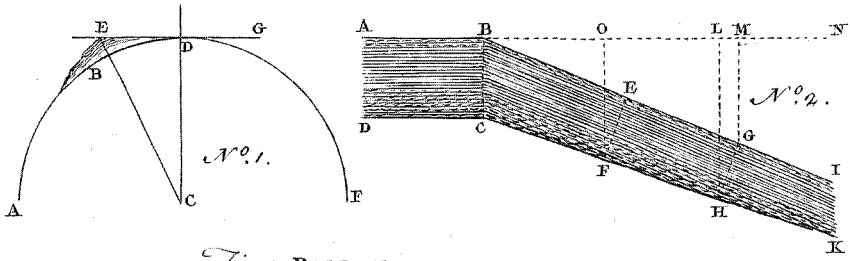


Fig. 2. ROCKETS

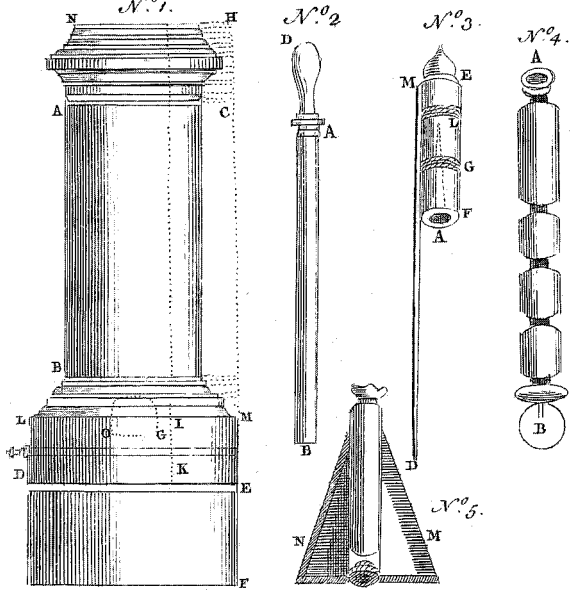


Fig. 3. The ROSE.

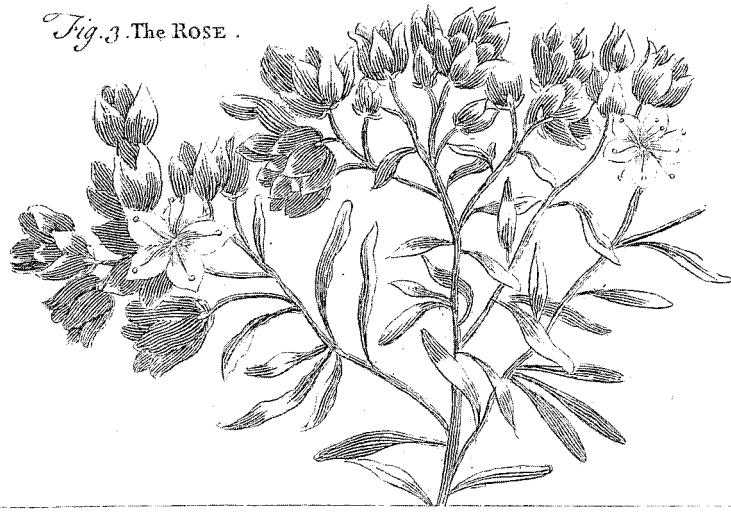
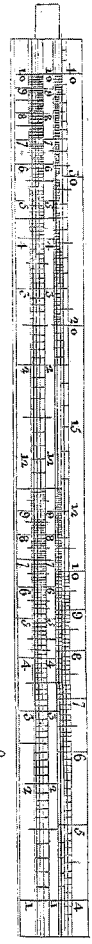


Fig. 4 Coggeshal's sliding-RULE.



T. Jefferys sculp

the bore in G is to be $\frac{1}{4}$ of the diameter of the cylinder; and in L $\frac{1}{8}$ of the lower diameter.

To make the rocket mount ſtraight up, it is tied faſt to the end of a long ſlender ſtick, MD (*ibid.* n° 3.) eight times as long as the rocket, in ſuch manner, as that, when poiſed on the finger near the touch-hole F, the ſtick (which is uſually made biggeſt at this end, and ſloping gently to the other) may preponderate, though very little. The rocket, thus equipped, is hung at freedom, and lighted with port-fire.

Note, ſome, inſtead of a ſtick to make the rocket mount, furniſh it with two wings, as MN (*ibid.* n° 5.) which have the ſame effect; and, inſtead of paper, ſome make the caſes of wood covered with leather; others of a thin iron-plate. And ſome, inſtead of a wooden ſtick, uſe an iron-wire, with a plummet at the end of it.

The compoſition wherewith rockets are filled, conſiſts of the following ingredients, *viz.* ſalt-petre, charcoal, and ſulphur, all well ground; but the proportions of theſe are various, for rockets of various ſizes; as in the following table. Noting, that, in ſmall rockets, gun-powder-duſt is added.

Compoſitions of ROCKETS of various ſizes.

Weight of Rocket.	Salt-pet.	Sulphur.	Charcoal.	Gun-powder duſt.
lb	lb	lb	lb	
100 or 60	30	10	20	
50 30	30	7	18	
20 18	42	12	26	
15 12	23	8	16	
10 9	62	9	20	
9 6	35	5	10	
5 4	64	8	16	
3 2	60	2	15	
1		2	6	32
Ounces.	Oun.	Oun.	Oun.	Ounces.
9	4	1	2	9
6	12	$1\frac{1}{2}$	4	15
3	2	$\frac{1}{2}$	$1\frac{1}{2}$	12
1			2	15

Note, ſeveral rockets being diſpoſed round the circumference of a wheel, whether circular or polygonous, the head of the one applied to the tail of another, and the wheel put in motion; as one rocket is ſpent, another will take fire; and the wheel be continued in its rotation.

As an additional ornament to rockets, it is uſual to furniſh them either with ſtars or with ſerpents, or ſparks, which take fire when the rocket burſts; and ſometimes little rockets are incloſed in great ones, to take fire when the large one is at its greateſt height.

To make ſtars for ROCKETS. Mix three pounds of ſalt-petre with eleven ounces of ſulphur, three ounces of beaten gun-powder, and ten of antimony. Moiſten the maſs with gum-water, and form them into little balls of the ſize of filberds; drying them well, either in the ſun or an oven. When dry, incloſe a number of them in the conical cap of the rocket.

Theory of the flight of ſky-ROCKETS. Mariotte takes the riſe of rockets to be owing to the impulſe or reſiſtance of the air againſt the flame: Dr. Deſaguliers accounts for it otherwiſe.

Conceive the rocket to have no vent at the choak, and to be ſet on fire in the conical bore; the conſequence will be, either that the rocket would burſt in the weakeſt place, or, if all its parts were equally ſtrong, and able to ſuſtain the impulſe of the flame, the rocket would burn out immoveable. Now, as the force of the flame is equable, ſuppoſe its action downwards, or that upwards, ſufficient to lift forty pounds. As theſe forces are equal, but their directions contrary, they will deſtroy each other's action.

Imagine, then, the rocket opened at the choak; by this means the action of the flame downwards is taken away, and there remains a force equal to forty pounds acting upwards, to carry up the rocket, and the ſtick it is tied to. Accordingly, we find that if the compoſition of the rocket be very weak, ſo as not to give an impulſe greater than the weight of the rocket and ſtick, it does not riſe at all; or if the compoſition be ſlow, ſo that a ſmall part of it only kindles at firſt, the rocket will not riſe.

The ſtick ſerves to keep it perpendicular; for if the rocket ſhould begin to ſtumble, moving round a point in the choak, as being the common center of gravity of rocket and ſtick, there would be ſo much friction againſt the air, by the ſtick between the center and the point, and the point would beat againſt the air with ſo much velocity, that the reaction of the medium would reſtore it to its perpendicularity.

When the compoſition is burnt out, and the impulſe upwards is ceaſed, the com-

mon center of gravity is brought lower towards the middle of the ſtick; by which means the velocity of the point of the ſtick is decreaſed, and that of the point of the rocket increaſed; ſo that the whole will tumble down, with the rocket-end foremoſt.

All the while the rocket burns, the common center of gravity is ſhifting and getting downwards, and ſtill the faſter and the lower, as the ſtick is the lighter; ſo that it ſometimes begins to tumble before it be burnt out; but when the ſtick is a little too heavy, the weight of the rocket bearing a leſs proportion to that of the ſtick, the common center of gravity will not get ſo low, but that the rocket will riſe ſtraight, though not ſo faſt.

Method of making a water-ROCKET. Make a rocket after the uſual manner, excepting the number of choaks. Let its diameter be equal to that of a leaden-ball, of two or three inches diameter, and let it be bored to a third part of its height. Incloſe the rocket in a hollow paper cylinder, which ſmear over with melted pitch or wax, that it may reſiſt the moiſture.

Note, the weight of the rocket is to be ſo proportioned to that of the water, that the whole cylinder may be immerged. Some, inſtead of a cylinder, uſe a truncated cone, or even a ſpheroid; and ſome hang a weight to the end at which it is lighted.

ROCKINGHAM, a market-town of Northamptonſhire, ſituated nineteen miles north of Northampton.

ROD, a wand, or long ſlender ſtaff.

ROD is alſo uſed for a land meaſure of ſixteeen feet and a half: the ſame with perch and pole.

ROD, in gauging. See GAUGING.

Black-ROD, a ſtaff carried by the king's gentleman-uſher, as a badge of his office; this rod or ſtaff is black, and has a lion in gold on its top. See USHER.

Fiſhing-ROD, a long taper rod or wand, to which the line is faſtened for angling.

Of theſe there are ſeveral ſorts; as, 1. The troller, or trolling-rod, which has a ring at the end, for the line to go through, when it runs off a reel. 2. The whipper, or whipping-rod, which is weak in the middle, and top-heavy, but very ſlender. 3. The dopper, which is a ſtrong rod, and very light. 4. The ſnapper, or ſnap rod, which is a ſtrong rod, peculiarly uſed for the pike. 5. The bottom-rod, which is the ſame as the dapper, only ſomewhat more pliable. 6. The ſniggling or poking ſtick, which is a forked ſtick, that has a ſhort ſtrong line baited with a lob-worm: this is only uſed for eels in their holes. See the article ANGLING, *&c.*

RODEZ, a city of France, in the province of Guienne: eaſt long. 2° 8′, north lat. 44° 20′.

RODRIGO. See CASTEL-RODRIGO.

ROE, the ſpawn or ſeed of fiſh. That of the male-fiſhes is uſually diſtinguiſhed by the name of ſoft-roe, or milt, and that of the female, by hard-roe, or ſpawn.

So inconceivably numerous are theſe ovula, or ſmall eggs, that M. Petit found 342144 of them in a carp of eighteen inches: but Mr. Leewenhoeck found in a carp no more than 211629. This laſt gentleman obſerves, that there are four times this number in a cod, and that a common one contains 9344000 eggs.

ROE is alſo one of the beaſts of chaſe, of the deer kind. See CERVUS.

The roe buck is called, the firſt year, a hind; the ſecond, a gyrle; the third, an henuſe; the fourth, a roe-buck of the firſt head; and the fifth, a fair roe-buck.

ROELLA, in botany, a genus of the *pentandria monogynia* claſs of plants, with a monopetalous infundibuliform-flower, divided into five parts at the limb; the fruit is a cylindraceous capſule, ſhorter than the cup, compoſed of a ſingle valve, and containing numerous angulated ſeeds; whence it is evidently diſtinct from the companula and polemonium.

ROER, the name of two rivers in Germany, one of which riſes on the confines of Heſſe, and falls into the Rhine, a little below Duyſburg; the other riſes in the dutchy of Juliers, and falls into the Maeſe at Roermond.

ROERMOND, a city of the United Netherlands, in the province of Gelderland: eaſt long. 5° 33′, north lat. 51° 18′.

ROGA, in antiquity, a preſent which the emperors made to the ſenators, magiſtrates, and even to the people; and the popes or patriarchs to their clergy.

Theſe rogæ were diſtributed by the emperors on the firſt day of the year, on their birth-day, or on the natalis dies of the cities: and by the popes and patriarchs, in paſſion-week.

Roga is alſo uſed for the common pay of the ſoldiers.

ROGA-

ROGAROFF, a city of Poland, in the dutchy of Lithuania: east long. 30°. north lat. 52° 45′.

ROGATION, in the roman juriſprudence, a demand made by the conſuls, or tribunes of the roman people, when a law was propoſed to be paſſed. Rogatio is alſo uſed for the decree itſelf made in conſequence of the peoples giving their aſſent to this demand, to diſtinguiſh it from a ſenatus conſultum, or decree of the ſenate.

ROGATION-WEEK, the week immediately preceding Whitſunday, ſo called from the three faſts therein on Monday, Tueſday, and Wedneſday, which are alſo called rogations, or rogation-days, from the extraordinary prayers and ſupplications at this time offered to God by devout chriſtians, to appeaſe his anger and deprecate his judgments.

ROGUE, in law, an idle ſturdy beggar; who by antient ſtatutes is for the firſt offence called a rogue of the firſt degree, and puniſhed by whipping, and boaring through the griſtle of the right ear with a hot iron; and for the ſecond offence, is termed a rogue of the ſecond degree, and if above eighteen years of age, ordered to be executed as a felon.

ROHAN, a town of France, in the province of Britany, ſituated twenty miles north of Vannes.

ROLDUC, a town of the Netherlands, in the dutchy of Limburg, five miles north of Aix-la-Chapelle.

ROLL, in manufactories, ſomething wound and folded up in a cylindrical form.

Few ſtuffs are made up in rolls, except ſattins, gawſes, and crapes, which are apt to break, and take plaits not eaſy to be got out, if folded otherwiſe. Ribbons, laces, galloons, and paduas of all kinds, are alſo thus rolled.

A roll of tobacco is tobacco in the leaf, twiſted on the mill, and wound twiſt over twiſt, about a ſtick or roller. A great deal of tobacco is ſold in America in rolls of various weights; and it is not till its arrival in England, Spain, France and Holland, that it is cut. See TOBACCO.

A roll of parchment, properly denotes the quantity of ſixty ſkins.

The antients made all their books up in the form of rolls, and in Cicero's time the libraries conſiſted wholly of ſuch rolls. See the article *Form of* BOOKS.

ROLL, in law, ſignifies a ſchedule or parchment which may be rolled up by the hand into the form of a pipe.

In theſe ſchedules of parchment all the pleadings, memorials, and acts of court, are entered and filed by the proper officer; which being done, they become records of the court. Of theſe there are in the exchequer ſeveral kinds, as the great wardrobe-roll, the cofferer's roll, the ſubſidy-roll, *&c.*

Roll is alſo uſed for a liſt of the names of perſons of the ſame condition, or of thoſe who have entered into the ſame engagement. Thus a court-roll of a manor, is that in which the names, rents, and ſervices of each tenant are copied and inrolled.

Calves-head ROLL, a roll in the two temples, in which every bencher is taxed yearly at 2 s. every barriſter at 1 s. 6 d. and every gentleman under the bar at 1 s. to the cook, and other officers of the houſe; in conſideration of a dinner of calves-heads, provided in Eaſter-term.

Muſter-ROLL, that in which are entered the ſoldiers of every troop, company, regiment, *&c.*

As ſoon as a ſoldier's name is written down on the roll, it is death for him to deſert.

ROLLS-OFFICE, is an office in Chancery-lane, London, appointed for the cuſtody of the rolls and records in chancery. See the article MASTER *of the rolls.*

Rider-ROLL, a ſchedule of parchment frequently ſewed or added to ſome part of a roll or record.

ROLLS *of parliament*, are the manuſcript regiſters, or rolls of the proceedings of our antient parliaments, which before the invention of printing were all engroſſed on parchment, and proclaimed openly in every county. In theſe rolls are alſo contained a great many deciſions of difficult points of law, which were frequently in former times referred to the deciſion of that high court.

ROLL, in antiquity. See ACACIA.

ROLL, or ROLLER, is alſo a piece of wood, iron, braſs, *&c.* of a cylindrical form, uſed in the conſtruction of ſeveral machines, and in ſeveral works and manufactures.

Thus in the glaſs manufacture they have a running-roll, which is a thick cylinder of caſt braſs, which ſerves to conduct the melted glaſs to the end of the table on which large looking-glaſſes, *&c.* are caſt. See the article GLASS.

Founders alſo uſe a roll to work the ſand which they uſe in making their moulds.

The preſſes called calenders, as ſerving

to

to calender ſtuffs withal, conſiſt, among other eſſential parts, of two rollers. It is alſo between two rollers that the waves are given to ſilks, mohairs, and other ſtuffs proper to be tabbied.

Impreſſions from copper-plates are alſo taken by paſſing the plate and paper between two rollers. See the article *Rolling-preſs* PRINTING.

Rolls, in flatting-mills, *&c.* are two iron inſtruments of a cylindrical form, which ſerve to draw or ſtretch out plates of gold, ſilver, and other metals.

Rolls, in ſugar-works, are two large iron barrels, which ſerve to bruiſe the canes, and to expreſs the juice. Theſe are caſt hollow, and their cavities are filled up with wood, the cylinders of which are properly the rollers.

Rolls, among book-binders, are indeed of a different form; theſe being a kind of ſmall braſs-wheels with flowers, leaves, *&c.* cut on the edge: theſe wheels are fixed on an axis to which there is a handle, and being rolled when hot round the edges, *&c.* of the cover of a book, leave the impreſſion of the flowers cut on the wheel, either plain or in gold.

Rollers, among gardiners, are large ſtone, iron, or wooden cylinders fixed in a large handle; and drawn over walks, graſs-plots, *&c.* to render them ſmooth and even.

Rolls, or rollers, among carpenters, maſons, *&c.* are plain cylinders three or four feet long, uſed for the moving of beams, huge ſtones, *&c.* Theſe are placed ſucceſſively under the fore-part of the body to be removed, which is at the ſame time puſhed forwards by leavers, *&c.* applied behind. For moving loads exceſſively heavy, the maſons, *&c.* have what they call endleſs rollers, which are about double the length and thickneſs of the common rollers, and beſides are girt with ſeveral large iron-hoops at each end: at a foot diſtance from the ends are four mortoiſes, or rather only two, but pierced through, into which are put the ends of long levers, which the workmen draw by long ropes faſtened to the ends, ſtill changing the mortoiſe as the roll has made a quarter of a turn. See LEVER.

ROLLER, in ſurgery, a long and broad bandage uſually of linnen-cloth, rolled round any part of the body, to keep it in, or diſpoſe it to a ſtate of health. See the article BANDAGE.

ROLLER, in ornithology, the grey ampelis, with the head variegated with black. See the article AMPELIS.

ROLLER is alſo the name of a ſpecies of the corvus, with a blood-red back, a green tail, and black wings. See the article CORVUS.

ROLLING-PRESS *printing*. See the article PRINTING.

ROMAN, in general, ſomething belonging to the city of Rome. See ROME.

For the roman ſenate, emperors, conſuls, prætors, quæſtors, ædiles, games, *&c.* See SENATE, EMPEROR, *&c.*

The term roman purple, is at preſent uſed to denote the dignity of a cardinal. See the article CARDINAL.

The roman catholics are thoſe chriſtians who follow the doctrines and diſcipline of the church of Rome; the ſubſtance of which may be ſeen in pope Pius's creed, and has been treated of in the courſe of this work, under the articles TRANSUBSTANTIATION, MARRIAGE, CELIBACY, BAPTISM, SACRAMENT, MONK, MASS, HOST, IMAGE, RELICS, PURGATORY, *&c. &c.*

King of the ROMANS, in modern hiſtory, is a prince elected to be ſucceſſor to the reigning emperor of Germany. See the articles EMPEROR, ELECTOR, *&c.*

ROMAN ORDER, in architecture, the ſame with the compoſite order. See the articles ORDER and COMPOSITE.

As to the roman ballance, indiction, year, language, citizens, *&c.* ſee the articles BALLANCE, INDICTION, *&c.*

ROMANCE, in matters of literature, a fabulous relation of certain adventures deſigned for the entertainment and inſtruction of the readers. See FABLE.

The true nature and genuine characteriſtics of this ſpecies of writing are excellently explained by the ingenious author of the Rambler; who obſerves, that the works of fiction, with which the preſent generation ſeems more particularly delighted, are ſuch as exhibit life in its true ſtate, diverſified only by the accidents that daily happen in the world, and influenced by thoſe paſſions and qualities which are really to be found in converſing with mankind.

This kind of writing may be termed not improperly the comedy of romance, and is to be connected nearly by the rules of comic poetry. Its province is to bring about natural events by eaſy means, and to keep up curioſity without the help of wonder: it is therefore precluded from the

the machines and expedients of the heroic romance, and can neither employ giants to ſnatch away a lady from the nuptial rites, nor knights to bring her back from captivity; it can neither bewilder its perſonages in deſarts, nor lodge them in imaginary caſtles.

Scaliger, upon Pontanus, remarks, that all his writings are filled with images, and that if you take from him his lillies and his roſes, his ſatyrs and his dryads, he will have nothing left that can be called poetry. In like manner, almoſt all the fictions of the laſt age will vaniſh, if you deprive them of a hermit and a wood, a battle and a ſhipwreck.

Why this wild ſtrain of imagination found reception ſo long, in polite and learned ages, it is not eaſy to conceive; but we cannot wonder, that, while readers could be procured, the authors were willing to continue it; for when a man had, by practice, gained ſome fluency of language, he had no farther care than to retire to his cloſet, to let looſe his invention, and heat his mind with incredibilities; and a book was produced without fear of criticiſm, without the toil of ſtudy, without knowledge of nature, or acquaintance with life.

The taſk of our preſent writers is very different; it requires, together with that learning which is to be gained from books, that experience which can never be attained by ſolitary diligence, but muſt ariſe from general converſe, and accurate obſervation of the living world. Their performances have, as Horace expreſſes it, *plus oneris quantum veniæ minus*, little indulgence, and therefore more difficulty. They are engaged in portraits of which every one knows the original, and can therefore detect any deviation from exactneſs of reſemblance. Other writings are ſafe, except from the malice of learning, but theſe are in danger from every common reader; as the ſlipper was cenſured by a ſhoemaker, who happened to ſtop in his way at the Venus of Apelles.

But the danger of not being approved as juſt copiers of human manners is not the moſt important apprehenſion that an author of this ſort ought to have before him. Theſe books are written chiefly to the young, the ignorant, and the idle, to whom they ſerve as lectures of conduct, and introductions into life. They are the entertainment of minds unfurniſhed with ideas, and therefore eaſily ſuſceptible of impreſſions; not fixed by principles, and therefore eaſily following the current of fancy; not informed by experience, and conſequently open to every falſe ſuggeſtion and partial account.

That the higheſt degree of reverence ſhould be paid to youth, and that nothing indecent or unſeemly ſhould be ſuffered to approach their eyes or ears, are precepts extorted by ſenſe and virtue from an antient writer, by no means eminent for chaſtity of thought. The ſame kind, though not the ſame degree of caution, is required in every thing which is laid before them, to ſecure them from unjuſt prejudices, perverſe opinions, and improper combinations of images.

In the romances formerly written, every tranſaction and ſentiment was ſo remote from all that paſſes among men, that the reader was in very little danger of making any applications to himſelf; the virtues and crimes were equally beyond his ſphere of activity; and he amuſed himſelf with heroes, and with traitors, deliverers and proſecutors, as with beings of another ſpecies, whoſe actions were regulated upon motives of their own, and who had neither faults nor excellencies in common with himſelf.

But when an adventurer is levelled with the reſt of the world, and acts in ſuch ſcenes of the univerſal drama, as may be the lot of any other man, young ſpectators fix their eyes upon him with cloſer attention, and hope, by obſerving his behaviour and ſucceſs, to regulate their own practices, when they ſhall be engaged in the like part.

For this reaſon, theſe familiar hiſtories may perhaps be made of greater uſe than the ſolemnities of profeſſed morality, and convey the knowledge of vice and virtue with more accuracy, than axioms and definitions. But if the power of example is ſo great, as to take poſſeſſion of the memory by a kind of violence, and produce effects almoſt without the intervention of the will, care ought to be taken, that, when the choice is unreſtrained, the beſt examples only ſhould be exhibited; and that which is likely to operate ſo ſtrongly, ſhould not be miſchievous or uncertain in its effects.

The chief advantages which theſe fictions have over real life, is, that their authors are at liberty, though not to invent, yet to ſelect objects, and to cull

from the mass of mankind, those individuals upon which the attention ought most to be employed; as a diamond, though it cannot be made, may be polished by art, and placed in such a situation, as to display that lustre which before was buried among common stones.

ROMANIA, a province of the pope's territories in Italy, including the Bolognese and Ferrarese. See the articles BOLOGNA and FERRARA.

ROMANIA is also the modern name of antient Thrace, which now makes a province of Turky in Europe; lying westward of the Propontis, between the Euxine sea and the Archipelago.

ROMANS, or ROMANT, an appellation formerly given to the polite french language, in opposition to the waloon. See the articles FRENCH and WALOON.

ROMANS is also a town of Dauphine, in France, situated on the river Isere, fifteen miles south-west of Grenoble.

ROME, *roma*, the capital of the pope's territories and of Italy, and antiently the mistress of the roman empire: east long. 13°, north lat. 41° 45'.

Rome is still a large and fine city, though not to be compared to antient Rome; the streets are spacious and magnificently built; it has five bridges over the Tiber, twenty gates, three hundred churches, and a vast number of palaces, convents, triumphal arches, pillars, obelisks, statues, theatres, &c.

ROMNEY, a borough-town of Kent, and one of the cinque ports, situated twelve miles south-west of Dover.

It sends two members to parliament.

ROMPEE, or ROMPU, in heraldry, is applied to ordinaries that are represented as broken, and to chevrons, bends, or the like, whose upper points are cut off. See plate CCXXXIII. fig. 3.

RONCIGLIONE, a town of Italy, in the pope's territories, and in St. Peter's patrimony, twenty-five miles north of Rome.

RONDA, a town of Spain, in the province of Granada, twenty-two miles north of Gibraltar.

RONDEL, in fortification, a round tower, sometimes erected at the foot of a bastion.

RONDELETIA, in botany, a genus of the *pentandria-monogynia* class of plants, the corolla whereof consists of a single petal of the infundibuliform-kind; the tube is cylindric and longer than the cup, and ventricose at the top; the limb is divided into five roundish segments, which bend backward: the fruit is a roundish coronated capsule, containing two cells; the seeds are numerous and small.

ROOD, a quantity of land equal to forty square perches, or the fourth part of an acre.

ROOF, in architecture, the uppermost part of a building.

The roof contains the timber-work, and its covering of slate, tile, lead, &c. tho' carpenters usually restrain the word to the timber-work only.

The form of roofs is various: sometimes it is pointed, in which case the most beautiful proportion is to have its profile an equilateral triangle: sometimes it is square, that is, the pitch or angle of the ridge is a right angle, which therefore is a mean proportion, between the pointed and flat roof, which last is in the same proportion as a triangular pediment: this is chiefly used in Italy, and the hot countries where there is but little snow. Sometimes roofs are made in the pinnacle-form: sometimes they have a double ridge, and sometimes they are mutilated, that is, consist of a true and a false roof, which is laid over the former: sometimes again they are in the form of a platform, as most of the eastern buildings are; and sometimes they are truncated, that is, instead of terminating in a ridge, the roof is cut square off at a certain height, covered with a terrass, and incompassed with a ballustrade; and sometimes, again, a roof is made in the manner of a dome. When the walls have been raised to their designed height, the vaults made, the joists laid, the stairs, &c. brought up, then the roof is to be raised, which embracing every part of the building, and with its weight equally pressing upon the walls, is a band to all the work; and besides, defends the inhabitants from rain or snow, the burning heat of the sun, and the moisture of the night, and is of no small advantage to the building, in casting off the rain water from the walls. See the article GUTTER.

ROOF-TREES, or RUFF-TREES, in a ship, are small timbers which go from the half-deck to the fore-castle, and serve to bear up the gratings.

This term is also used for the upper timbers in any building.

Hip-ROOF. See the article HIP-ROOF.

ROOK, in ornithology, a species of the wholly black corvus. See CORVUS.

ROOM, a chamber, parlour, or other apartment in a house. See BUILDING.

Rooms are either made with a vaulted

or flat ceiling. If with a flat ceiling, Palladio says, that the height from the floor to the ceiling must be equal to their breadth; and the rooms above must be a sixth part less in height than those below: but if they are vaulted, the height of the vaults in rooms that are square, is a third part more than its breadth.

With regard to the compartment and disposition of rooms, he says, that the halls and magnificent rooms ought to be light and easy of ascent; and that the small rooms may be divided off to make closets. That the rooms for summer ought to be spacious and turned to the north; and those for the winter to the south and west, and rather small than otherwise: because we seek the shade in summer, and in winter the sun; besides small rooms are more easily warmed than large. But the large rooms with the middling, and those with the small, ought to be so distributed that one part of the fabric may correspond with the other, and that the body of the edifice may have in itself a certain convenience in its members, which may render the whole beautiful and graceful.

ROOMS, in a ship, are places divided by partitions or bulk-heads. See the articles GUN-ROOM, COOK-ROOM, &c.

ROOMER, in the sea-language; a ship is said to be a roomer when she is larger than ordinary.

ROOT, *radix*, among botanists, denotes that part of a plant which imbibes the nutritious juices of the earth, and transmits them to the other parts. See the articles PLANT and VEGETATION.

The roots of plants are distinguished, according to their different forms, into bulbose, fibrose, granulose, grumose, tuberose, and tap-roots. See BULBOSE, &c.

As to the gathering and preserving roots for medicinal uses, the Edinburgh-dispensatory directs, that the annual roots be taken up before they shoot out stems or flowers; the biennial ones, for the most part, in the autumn of the first year; and the perennial ones when the leaves begin to fall, and therefore generally in autumn: then being cleansed by washing, and freed from the withered and decayed fibres, they are to be hung in a shady place pervious to the air, till they are moderately dry: the thicker roots should be slit lengthwise; or they may be cut transversely into thin pieces, and the pith taken out. These roots, which are very numerous, have been treated of under their several articles RHUBARB, JALAP, HELLEBORE, &c. &c.

ROOT-GRAFTING, in gardening. See the article GRAFTING.

ROOT, in mathematics, a quantity considered as the basis or foundation of a higher power; or one which being multiplied into itself any number of times, produces a square, cubic, biquadratic, &c. quantity; called the second, third, fourth, &c. power of the root, or quantity, so multiplied into itself: thus a is the square root of $a \times a$, or a^2; and 4 the square root of $4 \times 4 = 16$. Again, a is the cube-root of $a \times a \times a = a^3$; and 3 the cube-root of $3 \times 3 \times 3 = 27$: and so on. See the articles INVOLUTION, POWER, and EXTRACTION *of roots*.

The roots of powers are expressed by placing the radical sign $\sqrt{\ }$ over them, with a number denoting what kind of root they are: thus the square or second root of 16 is expressed by $\sqrt[2]{16}$, and the cube or third root of 27 by $\sqrt{27}$; and, in general, the nth root of a raised to the power m, is expressed by $\sqrt[n]{a^m}$. When the root of a compound quantity is wanted, the vinculum of the radical sign must be drawn over the whole: thus the square root of $a^2 + 2ab + b^2$ is expressed by $\sqrt[2]{a^2 + 2ab + b^2}$; and it ought to be observed, that when the radical sign has no number above it, to denote what root is wanted, the square root is always meant; as $\sqrt{a^2}$, or $\sqrt{16}$, is the square root of a^2, or the square root of 16.

ROOTS, *radices*, in grammar, are the primitive words of a language, whence the others are formed or derived. See the articles WORD and LANGUAGE.

ROPE, hemp, hair, &c. spun out into a thick yarn, and then several strings of this yarn twisted together by means of a wheel. When made very small it is called a cord, and when very thick, a cable. See CORD and CABLE.

Dr. Desaguliers, in the first volume of his Experimental Philosophy, has computed the forces necessary to bend ropes of different diameters, stretched by different weights, round rollers of different bigness, to be as in the following table.

Diameters of the ropes of three ſtrands, expreſſed in tenth parts of an inch.	Weights ſtretching the ropes, expreſſed in *lb.* avoirdupois.	Reſiſtance about a roller of half an inch diameter, in *oz.* avoirdupois.	Reſiſtance about a roller of one inch diameter in *oz.* avoirdupois.	Reſiſtance about a roller 1 ½ inches diameter in *oz.* avoirdupois.
0.5	60*lb.*	225 *oz.*	112½ *oz.*	75 *oz.*
0.2	60	90	45	30
0.1	60	45	22½	15
0.5	40	150	75	50
0.2	40	60	30	20
0.1	40	30	15	10
0.5	20	75	37½	25
0.2	20	30	15	10
0.1	20	15	7½	*

On the whole, it is found by experiments, that the difficulty of bending a rope round a roller decreaſes directly as the diameter of the roller increaſes; or is, inverſely, as the diameter of the roller.

Ropes are made for various uſes, as for binding, ſtaying, drawing, ſuſpending, *&c.*

The greateſt conſumption of ropes is in navigation, for the tackling of ſhips: where, though ropes include the whole cordage, there are ſeveral particularly ſo denominated, and which have particular names given to them: theſe are, 1. Auning-ropes, which are for ſpreading the aunings. 2. Bell-ropes, which are made faſt to the crank for ſtriking it. 3. Boat-rope, that by which the boat at the ſtern is towed. 4. Bolt-ropes, the head and body ropes ſowed round the ſails. 5. Breaſt-rope, that made faſt to the ſhrouds in the chains, to ſupport the man that heaves the lead. 6. Bucket-rope, that which is tied to the bucket, for hauling up water. 7. Buoy-rope, that which is tied to the buoy by one end, and to the ſtock of the anchor by the other. 8. Can-hook-ropes, which are ſeized to each hook, to hoiſt hogſheads, *&c.* on board. Cat-rope, that uſed for hoiſting up the anchor in order to be ſtowed at the bow. 10. Davit-rope, is reeved through a hole made at each end, for hauling the davit to either ſide of the fore-caſtle. 11. Entring-rope, to take hold of, in going up the ſhip's ſide. 12. Luff-hook-rope, is for bouſing the tack aboard, when it blows hard, and is a ſort of preventer to the tack. 13. Grapnel-rope, that which being bent to a grapnel, either the long-boat, pinnace, or yawl rides by it. 14. Gueſs-rope, is for keeping the long-boat, pinnace, or yawl from ſteeving, or going too much in and out when towing. 15. Parrel-rope is reeved through the ribs and trucks, and, with the breaſt-ropes, laſhes the parrel to the maſts. 16. Rudder-rope, that reeved through a hole in the boat's rudder. 17. Slip-rope is for triſeing up the bites of the cable to the rails of the head. 18. Stantion-ropes, thoſe reeved through the eyes of the ſtantions. 19. Swabb-rope ſerves as a handle to the eyes of the ſtantions. 20. Top-ropes are thoſe with which the top-maſts are ſet or ſtruck; they are reeved through an iron-bound block, which hooks under the cap, and then reeved through the heel of the top-maſt; the other part of them comes down to the top-tackle-falls, which has double blocks iron-bound, and hooks to ring bolts upon the deck. 21. Tiller-ropes, are to keep the tiller ſteady, that it may not fly from ſide to ſide. 22. Waſt-ropes, for boats to make faſt to, along ſide. 23. Wheel-rope, that which goes round the ſpindle of the ſteering-wheel, and from thence to the titter.

ROPE-YARN, among ſailors, is the yarn of any rope untwiſted, but commonly made up of junk; its uſe is to make ſinnet, mats, *&c.*

ROS, DEW. See the article DEW.

ROSACEOUS, among botaniſts, an appellation given to ſuch flowers, as are compoſed of ſeveral petals or leaves, diſpoſed in a ſort of circular form, like thoſe of the roſe: ſuch are the flowers of the piony, crowfoot, cinquefoil, *&c.* In this ſort of flowers the diſpoſition only of the leaves is regarded, their number being of no conſequence. It is very ſeldom that the number is two or four, except in the circæa and onagra. The moſt frequent number of leaves in theſe flowers is five, and ſuch as have four differ from the cruciform flowers, not only in their diſpoſition, but in this, that the number is in the ſame ſpecies indeterminately, four, five, or ſix, as is the caſe in the clematitis, the capers, and the ſpecies of rue, whereas in the cruciform ones it is ever conſtant. See BOTANY.

ROSARY, among the roman-catholics, the ſame with chaplet. See CHAPLET.

Before a perſon repeats his roſary, he muſt croſs himſelf with it; he muſt then repeat

repeat the apoſtles' creed, and ſay a paternoſter, and three aves, on account of the three relations which the virgin bears to the three perſons in the trinity; after which he paſſes on to his decads.

Roſary alſo denotes a particular form of devotion addreſſed to the virgin, to which the chaplet of that name is accommodated.

ROSCOMMON, a county of Ireland, bounded by Letrim on the north, and Galway on the ſouth.

ROSE, *roſa*, in botany, a genus of the *icoſandria-polygynia* claſs of plants, the flower of which is compoſed of five petals, obverſely cordated, and arranged in a circular form: the fruit is formed of the fleſhy baſe of the cup, which is of a turbinated figure, coloured, ſoft, containing only one cell drawn together at the neck, and coronated with ſome irregular laciniæ; the ſeeds are numerous, oblong and hairy. See plate CCXXXIV. fig. 3.

The wild briar, with beautiful pinnated leaves, a white or pale red flower, and the common hip for its fruit, is that above deſcribed: and, indeed, all the beautiful roſes in our gardens, are only varieties of this ſpecies, principally owing to culture; the red, the damaſk, the white, the variegated, *&c.* roſes, being all produced from this original ſpecies.

The flowers of the red roſe are aſtringent, thoſe of the damaſk-roſe purgative, and the fruit of the wild roſe pectoral. The roſe-water of the ſhops, diſtilled from the flowers of the damaſk-roſe, has been celebrated for many virtues; but its fragrant ſmell is the only quality now regarded in it. There is alſo a ſyrup, made either from the juice, or infuſion of the freſh flowers of damaſk-roſes.

Bay-ROSE, and ROSE *of Jericho*. See the articles NERIUM and HESPERIS.

ROSE, in architecture, an ornament cut in the form of a roſe, chiefly uſed in corniches, frizes, vaults of churches, *&c.* and particularly in the middle of each face in the corinthian abacus.

ROSE-NOBLE, an antient engliſh gold-coin, firſt ſtruck in the reign of Edward III. It was formerly current at 6s. 8d. and ſo called becauſe ſtamped with a roſe.

ROSE-WOOD, *rhodium*, or *aſpalathum*, in the materia medica. See ASPALATH.

ROSEBRUGGE, a town of Flanders, eleven miles north-weſt of Ypres.

ROSEMARY, *roſmarinus*, in botany, a genus of the *diandria-monogynia* claſs of plants, with a ringent monopetalous flower, whereof the upper lip is bifid and erect, and the under lip trifid and reflex; there is no pericarpium, the cup holding the four ſeeds in its bottom.

Roſemary has at all times been a favourite ſhrub in medicine: it is full of volatile parts, as appears by its taſte, ſmell, and analyſis. It is a very valuable cephalic, and is good in all diſorders of the nerves, and in hyſteric and hypochondriac caſes. It is good in palſies, apoplexies, epilepſies, and vertigoes. It ſtrengthens the ſight, and ſweetens the breath. It is greatly commended by ſome againſt obſtructions of the viſcera, particularly of the liver and ſpleen; and in the jaundice. The flowers have the credit of being great cordials; and ſome imagine they even poſſeſs the virutes of the whole plant in a more exalted degree than any other part. However, the flowery tops, leaves, and huſks, together with the leaves themſelves, are much fitter for all purpoſes, than the flowers alone.

ROSICRUCIANS, or ROSYCRUCIANS, See the article ROSYCRUCIANS.

ROSIENNE, a town of Samogitia, in Poland: eaſt longit. 23° 30′, north lat. 55° 50′.

ROSIN, or RESIN. See RESIN.

ROSS, a county of Scotland, bounded by Sutherland on the north, by the German ſea and the Murray frith on the eaſt and ſouth, and by Inverneſs-ſhire and the weſtern ocean on the ſouth and weſt.

ROSS is alſo a market-town, ſituated on the river Wye, eleven miles ſouth of Hereford.

ROSSANO, a city and port-town of Calabria, in the kingdom of Naples, eighty miles ſouth-weſt of Taranto.

ROSSE, a port-town of Ireland, twenty-two miles weſt of Kinſale.

ROS-SOLIS, SUN-DEW, an agreeable ſpirituous liquor, compoſed of burnt brandy, ſugar, cinnamon, and milk-water; and ſometimes perfumed with a little muſk. it is ſo called, as being at firſt prepared wholly of the juice of the plant ros-ſolis, or droſera. See the article DROSERA.

ROSTING, or ROASTING. See the article ROASTING.

ROSTOCK, an imperial city of lower Saxony, ſituated on a bay of the Baltic ſea: eaſt longit. 12° 15′, and north lat. 54° 20′.

ROSTOF, or ROSTOVA, the capital of a territory of the ſame name, in Ruſſia:

eaſt longitude 40°, and north latitude 57° 20′.

ROSTRA, in antiquity, a part of the roman forum, wherein orations, pleadings, funeral harangues, *&c.* were delivered.

ROSTRI-FORMIS PROCESSUS, in anatomy. See the article CORACOIDES.

ROSTRUM literally denotes the beak or bill of a bird; and hence it has been figuratively applied to the beak, or head of a ſhip.

ROSTRUM, in chemiſtry, implies the noſe or beak of the common alembic, which conveys the liquor diſtilled into its receiver. See the article ALEMBIC.

ROSYCRUCIANS, ROSICRUCIANS, or *brothers of the roſy croſs*, a name aſſumed by a ſect or cabal of hermetical philoſophers, who appeared, or at leaſt were firſt taken notice of, in Germany, in the beginning of the XVIth century. They pretended to be maſters of all ſciences, and to have many important ſecrets, particularly that of the philoſopher's ſtone. See the article PHILOSOPHER.

Their ſociety is frequently denoted by the abbreviatures F. R. C.

ROT, a diſeaſe incident to ſheep, ariſing from wet ſeaſons, and too moiſt paſture.

It is a very hard thing to prevent the rot, if the year prove very wet, eſpecially in May and June. Salt-marſhes, and lands where broom grows, are the beſt places of preſervation for them. Sheep are ſometimes all cleared of the rot, when not too far gone with it, only by removing them into broom-fields. Scurvy-graſs, muſtard, parſley, and thyme are alſo good for the prevention of it.

Some propoſe the giving ſheep half a handful of bay-ſalt, every month or oftener; and there is great probability that this may be of ſervice: but the rational way of attacking all diſorders in cattle, is by conſidering what are the cauſes of them. It will appear, upon enquiry, that wet ſeaſons are the general occaſions of the rot in ſheep, and therefore it would be adviſable for the owners, when ſuch ſeaſons come on, to remove thoſe animals into the drieſt paſtures they can, and then to feed them principally with dry ſweet hay, oats, bran, and the like; this would prevent the occaſion: and if they were already a little infected, ſome ſalt given with their dry food, would be a happy means of curing them.

ROTA, WHEEL, in mechanics. See the article WHEEL.

There is a celebrated problem in mechanics, called rota ariſtotelica, Ariſtotle's wheel, becauſe that philoſopher is the firſt who took notice of it. The matter to be accounted for, is how a point in the nave of a wheel comes to deſcribe, during one revolution, a line equal to the length of the outer circumference of the wheel, when a point in the outer circumference does no more.

Many great men having attempted in vain to account for this phænomenon, Mr. de Meyran, a french gentleman, had the good fortune to light on a ſolution of it, which the Academy of Sciences declared to be ſatisfactory. It is this: a wheel is only acted on, or drawn forward, in a right line: its circular motion, or rotation, ariſing purely from the reſiſtance of the ground whereon it is applied. Now this reſiſtance is equal to the force wherewith the wheel is drawn in the right line, inaſmuch as it defeats that direction; and, conſequently, the cauſes of the two motions being equal, their effects are equal too; or, a point in the wheel deſcribes, during one revolution, a right line on the ground equal to its outer circumference.

But as to the nave of the wheel, the caſe is otherwiſe; for though it is drawn in a right line by the ſame force as the outer circumference, yet it only turns round becauſe the wheel turns, and can only turn with it, and in the ſame time. Hence it follows, that its circular velocity is leſs than that of the circumference of the wheel, in the ratio of the two circumferences; and therefore, of courſe, its circular motion is leſs than its rectilinear one. Since then it neceſſarily deſcribes a right line equal to that deſcribed by the circumference of the wheel, it can only do it by ſliding along.

ROTA is alſo the name of an eccleſiaſtical court at Rome, compoſed of twelve prelates, whereof one muſt be a German, another a Frenchman, and two Spaniards; the other eight are Italians, three of whom muſt be Romans, and the other five a Bologneſe, a Ferraran, a Milaneſe, a Venetian, and a Tuſcan.

This is one of the moſt auguſt tribunals in Rome, which takes cognizances of all ſuits in the territory of the church, by appeal; as alſo of all matters beneficiary and patrimonial.

ROTATION, in geometry, a term chiefly applied to the circumvolution of any ſurface

ſurface round a fixed and immoveable line, which is called the axis of its rotation: and by ſuch rotations it is, that ſolids are conceived to be generated. See the article GENESIS.

The late ingenious Mr. de Moivre ſhews, how ſolids, thus generated, may be meaſured or cubed. His method is this: for the fluxion of ſuch ſolids, take the product of the fluxion of the abſciſs, multiplied by the circular baſe; and ſuppoſe the ratio of a ſquare to the circle inſcribed in it to be $\frac{n}{1}$: then the equation expreſſing the nature of any circle, whoſe diameter is d, is $yy = dx - xx$. Therefore $\frac{4dxx - x^2x}{n}$ is the fluxion of a portion of the ſphere; and, conſequently, the portion itſelf $4\frac{1}{2}dxx - x\frac{1}{3}x^3$, and the circumſcribed cylinder is $\frac{4dxx - x^3}{n}$; and therefore the portion of the ſphere is to the portion of the circumſcribed cylinder, as $\frac{1}{2}d - \frac{1}{3}x$ to $d - x$.

ROTATION, or REVOLUTION, in aſtronomy. See REVOLUTION.

ROTATORES, in anatomy, the name by which ſome call the oblique muſcles of the eye. See EYE and OBLIQUUS.

ROTATORES is alſo applied to the trochanters of the thigh-bone. See the article FEMORIS OS and TROCHANTER.

ROTENBURG, a town of Franconia, in Germany: eaſt long. 10° 5′, north lat. 49° 20′.

ROTENBURG is alſo a town of lower Saxony, in the dutchy of Verden, twenty-four miles eaſt of Bremen.

ROTHER, or RUDDER. See RUDDER.

ROTHERAM, a market-town of Yorkſhire, thirty-five miles ſouth-weſt of York.

ROTHSAY, a parliament-town of Scotland, in the iſle of Bute: weſt longit. 5°, and north lat. 55° 50′.

ROTING, a town of Franconia, in Germany: eaſt long. 9° 50′, and north lat. 49° 30′.

ROTONDO, or ROTUNDO, in architecture, an appellation given to any building that is round both within and without ſide, whether it be a church, a ſalon, or the like. The moſt celebrated rotondo of the antients, is the pantheon at Rome. See the article PANTHEON.

ROTTENNESS, or PUTREFACTION. See the article PUTREFACTION.

ROTTERDAM, a city of the province of Holland, ſituated on the north bank of the Maeſe, thirty miles ſouth of Amſterdam, and thirteen miles ſouth-eaſt of the Hague: eaſt long. 4° 20′, and north lat. 52°.

ROTULA, in anatomy, the ſame with the patella. See the article PATELLA.

ROTULORUM CUSTOS. See CUSTOS.

ROTULUS, a ROLL. See ROLL.

ROTUNDO, or ROTONDO. See the article ROTONDO.

ROTUNDUS, in anatomy, a name given to ſeveral muſcles, otherwiſe called teres. See the articles TERES and MUSCLE.

Pronator ROTUNDUS. See PRONATOR.

ROTWEIL, a town of Swabia, in Germany, ſituated on the river Neckar: eaſt long. 8° 30′, and north lat. 48° 8′.

ROUCOU, in botany, the name of a ſpecies of mitella. See MITELLA.

ROUEN, a city of France, and capital of Normandy, ſituated on the north ſide of the Seyne, ſixty-five miles north of Paris, and forty-five miles ſouth-eaſt of Havre de Grace and the Britiſh Channel: eaſt long. 1° 6′, north lat. 49° 30′.

ROVEREDO, a city of the biſhopric of Trent, eight miles ſouth of Trent.

ROVERGNE, a diviſion of Guienne, in France.

ROUGE-CROSS. See POURSUIVANT.

ROUGHNESS, in mechanics. See the articles FRICTION and RESISTANCE.

ROVIGO, the capital of the Poleſin de Rovigo, in Italy, ſubject to Venice: eaſt long. 12° 25′, north lat. 45° 6′.

ROUND, *rotundus*, in geometry. See the articles CIRCLE, GLOBE, and SPHERE.

The italian muſicians give the name of *b* round, to what we call a flat *b*. See the article FLAT.

ROUND, in a military ſenſe, ſignifies a walk which ſome officer, attended with a party of ſoldiers, takes in a fortified place around the ramparts, in the night-time, in order to ſee that the centries are watchful, and every thing in good order.

The centries are to challenge the rounds at a diſtance, and reſt their arms as they paſs, to let none come near them; and when the round comes near the guard, the centry calls aloud, *who comes there?* and being anſwered, *the rounds*; he ſays *ſtand*; and then calls the corporal of the guard, who draws his ſword, and calls alſo, *who comes there?* and when he is anſwered, *the rounds*, he who has the word advances, and the corporal receives it.

it with his ſword pointed to the giver's breaſt. In ſtrict garriſon the rounds go every quarter of an hour.

Way of the ROUNDS. See WAY.

Counter-ROUNDS. See COUNTER.

ROUND-HOUSE, a kind of priſon, for the nightly watch in London to ſecure diſorderly perſons, till they can be carried before a magiſtrate. See WATCH.

ROUND-HOUSE, in a ſhip, the uppermoſt room, or cabbin, on the ſtern of a ſhip, where the maſter lies.

To ROUND *a horſe*, in horſemanſhip, a general term for all ſorts of maneges upon a volt, or circular tread. See the article VOLT.

ROUNDELAY, a kind of antient poem, thus termed, according to Menage, from its form, becauſe it turns back again to the firſt verſe, and thus goes round. This poem is little known among us, but is very common among the French, who call it rondeau. It conſiſts commonly of thirteen verſes, eight whereof are in one rhyme, and five in another. It is divided into couplets, at the end of the ſecond and third whereof the beginning of the roundelay is repeated, and that if poſſible in an equivocal or pauſing ſenſe.

ROUNDELET. See RUNDLET.

ROUNDNESS, ROTUNDITY. See the article SPHERICITY.

ROUNDO, ROUNDELAY, in muſic, a kind of burden or ritornello, where the beginning of each couplet is repeated at the end thereof.

ROUSE, among falconers, is when a hawk lifts up and ſhakes herſelf.

ROUSE *a hawſer*, or *cable*, in the ſea-language, ſignifies to haul in part of the hawſer or cable, which lies ſlack in the water.

ROUSELAER, a town of the Netherlands, in the province of Flanders, ſituated eleven miles north-eaſt of Ypres.

ROUSILLON, formerly a province of Spain, now united to France, is bounded by Languedoc on the north, by the Mediterranean ſea on the eaſt, by Catalonia on the ſouth, and by the Pyrenean mountains on the weſt, being about fifty-five miles long, and thirty-ſix broad.

ROUSSIN, in the manege, is a ſtrong, well-knit, and ſtowed horſe, ſuch as are brought into France from Germany and Holland.

ROUT, a public road, highway, or courſe, eſpecially that which military forces take. This word is alſo uſed for the defeat and flight of an army.

ROUT, in law, is applied to an aſſembly of perſons, going forcibly to commit ſome unlawful act, whether they execute it or not.

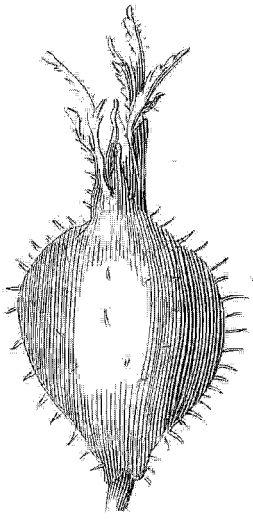
The difference between a rout and a riot ſeems to be this, that a rout is where perſons are unlawfully aſſembled, and have moved forwards, in order commit the unlawful act intended, but part without doing it: whereas riot is taken for the diſorderly fact commited by any ſuch unlawful aſſemby. Two things, however are common both to riot and rout, as alſo unlawful aſſembly; the one is, that three perſons at leaſt be gathered together: the other is, that, being gathered together, they diſturb the peace either by words, ſhew of arms, turbulent geſture, or actual violence. See RIOT.

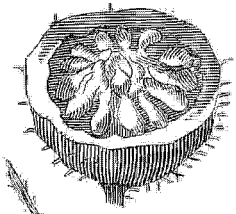
ROWEL, among farriers, a kind of iſſue, made by drawing a ſkain of ſilk, thread, hair, or the like, through the nape of the neck, or other part, of a horſe; anſwering to what, in ſurgery, is called a ſeton. See the article SETON.

The rowelling of horſes is a method of cure frequently had recourſe to, in caſes of inward ſtrains, eſpecially about the ſhoulders or hips, as alſo for hard ſwellings not eaſy to be diſſolved. The operation is this: a little ſlit being made through the ſkin, about an handbreadth below the part aggrieved, big enough to put a ſwan's quill in; the ſkin is raiſed from the fleſh, the end of the quill put in, and the ſkin blowed from the fleſh upwards, and all over the ſhoulder; then the hole being ſtopped with the finger, the part blown is beat with an hazel-ſtick, and the wind ſpread with the hand all over, and then let go; this done, a ſkain of horſe-hair, or red ſarſenet, half the thickneſs of the little finger, is put in a rowelling needle, ſeven or eight inches long, and the needle is put into the hole, and drawn through again, ſix or ſeven inches higher; then the needle is drawn out, and the two ends of the rowel tied together, anointing it every day, as well as before the putting it in, with ſweet butter and hog's greaſe, and drawing it backwards and forwards in the ſkin, to make the putrid matter diſcharge itſelf more plentifully.

Others, diſliking theſe rowels, as making too large a ſore and ſcar, uſe the french rowel, which is a round piece of ſtiff leather, with a hole in the midſt, laying it flat between the fleſh and ſkin, the hole in the rowel juſt againſt that in the

Fig. 1. RUTA, *RUE*.





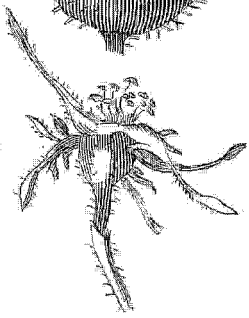
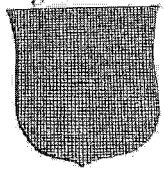


Fig. 2. RUBIA, *MADDER*.

Fig. 4. RUBUS.

Fig. 3. The RUFF.

Fig. 5. SABLE.



the ſkin, ſewing it with a needle and thread drawn through the hole and the ſkin, cleaning it once in two or three days, and then anointing it afreſh.

ROWELS *of a ſpur*. See SPUR.

ROWS *of trees*. See PARALLELISM.

ROXBURGH. See TIVIOTDALE.

ROXENT CAPE, or ROCK *of Liſbon*, a mountain and remarkable promontory in Portugal, ſituated in the Atlantic ocean, at the north entrance of the river Tagus, twenty-two miles north of Liſbon.

ROYAL, or REGAL, ſomething belonging to a king: thus we ſay, royal family, royal aſſent, royal exchange, *&c.* See the articles FAMILY, ASSENT, *&c.*

ROYALTIES, the rights of the king, otherwiſe called the king's prerogative, and the regalia. See PREROGATIVE and REGALIA.

ROYAN, a caſtle of France, in the province of Saintonge, ſituated at the mouth of the river Garonne, thirty miles ſouth of Rochelle.

ROYENA, in botany, a genus of the *decandria digynia* claſs of plants, the corolla whereof is formed of a ſingle petal; the tube is of the length of the calyx; the limb is patent, reflex, and divided into five oval ſegments; the fruit is a roundiſh capſule, formed of four valves, marked with four furrows, but containing only one cell; the ſeeds are four oblong triangular nuts, included in a calyptra.

ROYENIA, in botany, the ſame with the loeſelia. See the article LOESELIA.

ROYSTON, a market-town, ſituated in the counties of Hertford and Cambridge, thirty-eight miles north of London.

RUATAN, an iſland in the gulph of Honduras, in north America: weſt longit. 89°, and north lat. 16°.

RUBARB. See RHUBARB.

RUBBING. See the articles ATTRITION and FRICTION.

RUBELLIO, in ichthyology, the name whereby ſome authors call the roach. See the article CYPRINUS.

RUBEOLA, in botany, the ſame with the crucianella. See CRUCIANELLA.

RUBETA, the TOAD, in zoology. See the article TOAD.

RUBIA, MADDER, in botany, a genus of the *tetrandria-monogynia* claſs of plants, the corolla whereof conſiſts of a ſingle, plane acute petal, hollowed at the baſe, and divided into four ſegments; the fruit conſiſts of two ſucculent, ſmooth, round berries, growing together; the ſeed is ſingle, roundiſh, and umbilicated. Se plate CCXXXV. fig. 2.

For the ſeveral uſes of this plant in dying, *&c.* ſee the article MADDER.

RUBICAN, in the manege. A horſe is ſaid to be of a rubican colour, when of a bay, ſorrel, or black, with a light grey or white upon the flanks, but ſo that this grey or white is not predominant there.

RUBIFYING, in chemiſtry, the act of turning a thing red by the force of fire, *&c.*

RUBIGALIA, in antiquity, a feaſt celebrated by the Romans, in honour of the god Rubigus, or the goddeſs Rubigo, to engage thoſe deities to preſerve the corn from blights and mildews.

The rubigalia were inſtituted by Numa, in the eleventh year of his reign, and were celebrated on the ſeventh of the calends of May.

RUBIGO, a diſeaſe incident to corn, commonly called mildew, being a ſpecies of blight. See the article BLIGHT.

RUBININSKA, one of the northern provinces of Ruſſia, bounded by the province of Dwina on the north, by Syrianes on the eaſt, by Belozero on the ſouth, and by the lake of Onega on the weſt.

RUBRIC, *rubrica*, in the canon-law, ſignifies a title or article in certain antient law-books; thus called becauſe written, as the titles of the chapters in our antient Bibles are, in red letters.

Rubrics alſo denote the rules and directions given at the beginning, and in the courſe of, the liturgy, for the order and manner in which the ſeveral parts of the office are to be performed. There are general rubrics and ſpecial rubrics, a rubric for the communion, *&c.* In the romiſh Miſſal and Breviary are rubrics for matins, for lauds, for tranſlations, beatifications, commemorations, *&c.*

RUBRICA, in natural hiſtory, a name given to ſeveral kinds of marles and ochres, the two principal of which are the rubrica fabrilis of authors, being a ſoft heavy red marle, commonly called reddle, and uſed by painters, *&c.* See the articles MARLE and REDDLE. The other, called the rubrica ſinopica of the antients, is a fine heavy purple ochre, much uſed both in painting and medicine. See OCHRE.

RUBUS, the BRAMBLE and RASPBERRY-BUSH, in botany, a genus of the *icoſandria-pentagynia* claſs of plants, the corolla whereof conſiſts of five roundiſh erecto-patent petals, of the length of the cup, and inſerted into it; the fruit is a compound

compound berry; the acini it is compoſed of are roundiſh, and arranged into a cluſter, convex at top and concave below, each acinus has only one cell; the ſeeds are ſingle and oblong; the receptacle of the pericarpia is conic; the acini in moſt of the ſpecies grow together ſo as to be inſeparable without breaking. See plate CCXXXV. fig. 4.

The uſe of this plant in medicine is as a refrigerant and aſtringent, and therefore the fruit, leaves, *&c.* are recommended in dyſenteries, vomitings, hæmorrhages of the womb, noſe, *&c.*

RUBY, *rubinus*, in natural hiſtory, a ſpecies of the *chroſtaſima* claſs of gems, being a beautiful gem of a red colour with an admixture of purple. See GEM.

This, in its moſt perfect and beſt coloured ſtate, is a gem of prodigious beauty and extreme value; it is often found perfectly pure and free from blemiſhes or foulneſs, but much more frequently debaſed greatly in its value by them, eſpecially in the larger ſpecimens. It is of very great hardneſs, equal to that of the ſapphire, and ſecond only to the diamond. It is various in ſize, but leſs ſubject to variations in its ſhape than moſt of the other gems. It is uſually found very ſmall, its moſt common ſize being equal to that of the head of the largeſt ſort of pins; but it is found of four, eight, or ten carats; and ſometimes, though very rare, up to twenty, thirty, or forty. It is never found of an angular or cryſtalliform ſhape, but always of a pebble-like figure, often roundiſh, ſometimes oblong and much larger at one end than at the other, and in ſome ſort reſembling a pear, and is uſually flatted on one ſide. It commonly is naturally ſo bright and pure on the ſurface, as to need no poliſhing; and when its figure will admit of being ſet without cutting, it is often worn in its rough ſtate, and with no other than its native poliſh. Our jewellers are very nice, though not perfectly determinate, in their diſtinctions of this gem, knowing it, in its different degrees of colour, under three different names: the firſt is ſimply the ruby, the name given it in its deepeſt coloured and moſt perfect ſtate: the ſecond is the ſpinel ruby; under this name they comprehend thoſe rubies which are of a ſomewhat leſs bright colour than the ruby ſimply ſo called: the third is the balaſs-ruby; under this name they expreſs a pale yet a very bright ruby, with a leſs admixture of the purple tinge than in the deeper coloured one; this is of leſs value than the deeper one.

We have the true ruby only from the eaſt-Indies; and the principal mines of it are in the kingdom of Pegu and the iſland of Ceylon. We have in Europe cryſtals tinged to the colour of the ruby, but they have nothing of its luſtre or hardneſs. The ruby ſeems to owe its colour to gold, it being poſſible to ſeparate a ſmall portion of gold from the little native rubies, and alſo to give the true colour of the ruby to fictitious paſte by means of that metal.

The way of preparing a metalline colour from gold and tin, for tinging glaſs of a ruby colour is, according to Shaw, as follows: Diſſolve gold in aqua-regia, and dilute the fine yellow ſolution with a large proportion of fair water; to the mixture add a ſufficient quantity of a ſaturated ſolution of tin, made alſo in aqua-regia, at ſeveral times, and a moſt beautiful red or purple-coloured powder will ſoon fall to the bottom of the containing glaſs: decant the liquor and dry the powder, a few grains whereof being melted along with white cryſtalline glaſs will tinge it throughout of an extremely fine purple or ruby colour.

In M. Savary's Dict. de Commerce, we have the following table of the value of rubies, from one carat, or four grains, to ten carats:

	l.	s.	d.
A ruby of one carat is worth	1	15	00
Of two	9	00	00
Of three	22	10	00
Of four	33	15	00
Of five	45	00	00
Of ſix	67	10	00
Of ſeven	84	00	00
Of eight	106	00	00
Of nine	150	00	00
Of ten	216	00	00

RUBY, in heraldry, denotes the red colour wherewith the arms of noblemen are blazoned; being the ſame which in the arms of others, not noble, is called gules. See the article GULES.

RUCTATION, BELCHING, a ventoſity ariſing from indigeſtion, and diſcharging itſelf at the mouth with a very diſagreeable noiſe. There are belches owing to repletion, and others to inanition, or emptineſs. Quincy ſays hypochondriac and hyſteric perſons are particularly liable to this diſorder. They are rather to be

be cured with proper ſtomachics than carminatives and hot liquors.

RUDBECKIA, DWARF SUN-FLOWER, in botany, a genus of the *ſyngeneſia-polygamia* claſs of plants, the compound flower of which is radiated; but the hermaphrodite corollulæ of the diſc are tubuloſe and very numerous: the ſtamina are five very ſhort capillary filaments; and there is a ſmall orbiculated ſeed after each of the hermaphrodite corollulæ, and are all contained in the cup, affixed to a paleaceous receptacle.

RUDDER, in navigation, a piece of timber turning on hinges in the ſtern of the ſhip, and which, oppoſing ſometimes one ſide to the water and ſometimes another, turns or directs the veſſel this way or that. See SHIP.

The rudder of a ſhip is a piece of timber hung on the ſtern-poſts by four or five iron-hooks, called pintles, ſerving as it were for the bridle of a ſhip to turn her about at the pleaſure of the ſteers-man. The rudder being perpendicular; and withoutſide the ſhip, another piece of timber is fitted to it at right angles, which comes into the ſhip, by which the rudder is managed and directed. This latter properly is called the helm or tiller; and ſometimes, though improperly, the rudder itſelf. The power of the rudder is reducible to that of the lever. See the article LEVER.

As to the angle the rudder ſhould make with the keel, it is ſhewn, that in the working of ſhips, in order to ſtay or bear up the ſooneſt poſſible, the tiller of the rudder ought to make an angle of 55° with the keel. A narrow rudder is beſt for a ſhip's ſailing, provided ſhe can feel it; that is, be guided and turned by it: for a broad rudder will hold much water when the helm is put over to any ſide; but if a ſhip have a fat quarter, ſo that the water cannot come quick and ſtrong to her rudder, ſhe will require a broad rudder. The aft-moſt part of the rudder is called the rake of the rudder.

RUDENTURE, in architecture, the figure of a rope or ſtaff, ſometimes plain, ſometimes carved, with which the third part of the flutings of columns are frequently filled up.

There are alſo rudentures in relievo laid on the naked of pilaſters not fluted: an inſtance of which we have in the church of St. Sapienza at Rome.

RUDERATION, in building, a term uſed by Vitruvius for the laying of pavement with pebbles.

To perform the ruderation it is neceſſary that the ground be well beaten, to make it firm, and to prevent it from cracking; then a ſtratum of little ſtones are laid, to be afterwards bound together with mortar made of lime and ſand. If the ſand be new, its proportion may be to the lime as three to one; if dug out of old pavements or walls, as five to two.

Ruderation, Daviler obſerves, is alſo uſed by Vitruvius for the coarſeſt and moſt artleſs kind of maſonry, where a wall is as it were cobled up.

RUDIARIUS, in antiquity, a veteran gladiator who had got a diſcharge from the ſervice. See GLADIATOR.

RUDIMENTS, *rudimenta*, the firſt principles or grounds of any art or ſcience, called alſo the elements thereof. See the article ELEMENT.

RUDIS, a knotty rugged ſtick, which the prætor among the Romans gave the gladiators as a mark of their freedom and diſmiſſion.

RUE, *ruta*, in botany. See RUTA.

RUELLIA, in botany, a genus of the *didynamia-angioſpermia* claſs of plants, the corolla whereof conſiſts of a ſingle petal: the tube is of the length of the cup, with a patulous inclined neck: the limb is quinquifid, patent, and obtuſe, with the two upper lacinii more reflex than the reſt: the fruit is a round capſule, acuminated on both ſides, of the length of the cup, ſemibilocular and bivalve: the ſeeds being a few in number, are roundiſh and compreſſed.

RUFF, in icthyology, a ſpecies of the perca, with a cavernous head, and only one fin on the back. See PERCA.

The uſual ſize to which this ſpecies arrives is four or five inches, though ſometimes it will grow longer: the head, in its general form is compreſſed, but flatted a little between the eyes; the beak is ſomewhat acute; the breaſt and belly are flatted; the eyes are large, and of a variety of colours; the teeth are ſmall but numerous, there is a row of them in each jaw, and on the anterior part of the palate there are a number of teeth, ſo minute that they can ſcarce be ſeen; the lateral line is ſomewhat crooked; the colour of the fiſh is a browniſh yellow with a number of black ſpots; the fin on the back has twenty-eight rays, the

pectoral-fins eighteen, and the belly-fins each ſix.

RUFF, in ornithology, a ſpecies of the tringa, with a granulated face, and a red beak and legs; it is about the bigneſs of the common jack-daw. See the article TRINGA.

The head is round, and covered with a large tuft of feathers, except the anterior part, which is naked, but the ſkin is elegantly granulated with ſmall red tubercles, diſpoſed regularly and cloſely over it; the eyes are large, their aſpect bright and piercing, and their iris of a bright-hazel colour; the beak is moderately long and obtuſe at the end, it is of a bright fine red at the baſe, and ſometimes all over; the upper chap is a little longer than the under one; the tongue is extended to the very top of the beak. See plate CCXXXV. fig. 3.

RUFTER-HOOD, among falconers, a plain leathern hood, large and open behind, to be worn by an hawk when ſhe is firſt drawn.

RUGEN, an iſland of the Baltic-ſea, on the coaſt of Germany, being part of the dutchy of ſwediſh Pomerania, ſeparated from the continent by a narrow channel: this iſland is thirty miles long, and near as many broad.

RUINS, a term particularly uſed for magnificent buildings fallen into decay, by length of time, and whereof there only remains a confuſed heap of materials.

RULE, *regula*, in matters of literature, a maxim, canon, or precept, to be obſerved in any art or ſcience.

The rules of philoſophizing, of reaſoning, of method, as alſo thoſe to be obſerved in logic, morality, poetry, medicine, rhetoric, &c. have been already delivered under the articles PHILOSOPHIZING, REASONING, &c.

RULE, in arithmetic, denotes an operation performed with figures, in order to diſcover ſums or numbers unknown.

The fundamental rules are addition, ſubtraction, multiplication, and diviſion. See ADDITION, &c.

But beſides theſe, there are other rules denominated from their uſe; as the rule of alligation, fellowſhip, intereſt, practice, reduction, &c. See the article ALLIGATION, &c.

RULE OF THREE, GOLDEN RULE, or RULE OF PROPORTION, is one of the moſt eſſential rules of arithmetic; for the foundation of which ſee the articles GEOMETRICAL PROPORTION.

It is called the Rule of Three from having three numbers given to find a fourth but more properly, the Rule of Proportion, becauſe by it we find a fourth number proportional to three given numbers: and becauſe of the neceſſary and extenſive uſe of it, it is called the Golden Rule. But to give a definition of it, with regard to numbers of particular and determinate things, it is the rule by which we find a number of any kind of things, as money, weight, &c. ſo proportional to a given number of the ſame things, as another number of the ſame or different things, is to a third number of the laſt kind of thing. For the four numbers that are proportional muſt either be all applied to one kind of things; or two of them muſt be of one kind, and the remaining two of another: becauſe there can be no proportion, and conſequently no compariſon of quantities of different ſpecies: as, for example, of three ſhillings and four days; or of ſix men and four yards.

All queſtions that fall under this rule may be diſtinguiſhed into two kinds: the firſt contains theſe wherein it is ſimply and directly propoſed to find a fourth proportional to three given numbers taken in a certain order; as if it were propoſed to find a ſum of money ſo proportioned to one hundred pounds as ſixty four pounds ten ſhillings is to eighteen pounds ſix ſhillings and eight pence, or as forty pounds eight ounces is to ſix hundred weight. The ſecond kind contains all ſuch queſtions wherein we are left to diſcover, from the nature and circumſtances of the queſtion, that a fourth proportional is ſought; and, conſequently, how the ſtate of the proportion, or compariſon of the term, is to be made; which depends upon a clear underſtanding of the nature of the queſtion and proportion. After the given terms are duly ordered, what remains to be done is to find a fourth proportional. But to remove all difficulty as much as poſſible, the whole ſolution is reduced to the following general rule, which contains what is neceſſary for ſolving ſuch queſtions wherein the ſtate of the proportion is given; in order to which it is neceſſary to premiſe theſe obſervations.

1. In all queſtions that fall under the following rule there is a ſuppoſition and a demand: two of the given numbers contain a ſuppoſition, upon the conditions whereof a demand is made, to which

which the other given term belongs; and it is therefore ſaid to raiſe the queſtion; becauſe the number ſought has ſuch a connection with it as one of theſe in the ſuppoſition has to the other. For example; if 3 yards of cloth coſt 4l. 10s. (here is the ſuppoſition) what are 7 yards 3 quarters worth? here is the demand or queſtion raiſed upon 7 yards 3 quarters, and the former ſuppoſition.

2. In the queſtion there will ſometimes be a ſuperfluous term; that is, a term which, though it makes a circumſtance in the queſtion, yet is not concerned in the proportion, becauſe it is equally ſo in both the ſuppoſition and demand. This ſuperfluous term is always known by being twice mentioned either directly, or by ſome word that refers to it. Example, if 3 men ſpend 20l. in 10 days, how much, at that rate, will they ſpend in 25 days? Here the 3 men is a ſuperfluous term, the proportion being among the other three given terms, with the number ſought; ſo that any number of men may be as well ſuppoſed as 3.

Rule. Firſt, The ſuperfluous term (if there is one) being caſt out, ſtate the other three terms thus: of the two terms in the ſuppoſition, one is like the thing ſought (that is, of the ſame kind of thing the ſame way applied); ſet that one in the ſecond or middle place; the other term of the ſuppoſition ſet in the firſt place, or on the left hand of the middle; and the term that raiſes the queſtion, or with which the anſwer is connected, ſet in the third place, or on the right hand; and thus the extremes are like one another, and the middle term like the thing ſought: alſo the firſt and ſecond terms contain the ſuppoſition, and the third raiſes the queſtion; ſo that the third and fourth have the ſame dependance or connection as the firſt and ſecond. This done,

Secondly, Make all the three terms ſimple numbers of the loweſt denominations expreſſed, ſo that the extremes be of one name. Then,

Thirdly, Repeat the queſtions from the numbers thus ſtated and reduced (arguing from the ſuppoſition to the demand) and obſerve whether the number ſought ought to be greater or leſſer than the middle term, which the nature of the queſtion, rightly conceived, will determine; and accordingly, multiply the middle term by the greater or leſſer extreme, and divide the product by the other, the quote is like the middle term, and is the complete anſwer, if there is no remainder; but if there is, then,

Fourthly, Reduce the remainder to the denomination next below that of the middle term, and divide by the ſame diviſor, the quotient is another part of the anſwer in this new denomination. And if there is here alſo a remainder, reduce it to the next denomination, and then divide. Go on thus to the loweſt denomination, where, if there is a remainder, it muſt be applied fraction-wiſe to the diviſor; and thus you will have the complete anſwer in a ſimple or mixed number.

Note, If any of the dividends is leſs than the diviſor, reduce it to the next denomination, and to the next again, till it be greater than, or equal to, the diviſor.

EXAMPLES.

Queſt. I. If 3 yards of cloth coſt 8s. what is the price of 15 yards? Anſw. 40s. or 2l.

Work.

yds. s. yds.
3 — 8 — 15
15
3|120|40s.

Explanation. 3 yards and 8s. contain the ſuppoſition, and 8s. is like the thing ſought; therefore 8s. is the middle term, and yards on the left: then the demand ariſes upon 15 yards, and therefore it is on the right. Again, from the nature of the queſtion it is plain, that 15 yards require more than 3 yards, *i. e.* the anſwer muſt be greater than the middle term; wherefore 8s. is to be multiplied by 15 yards; the product is 120s. which divided by 3 yards, quotes 40s. without a remainder; ſo 40s. or 2l. is the number ſought.

Queſt. II. If 4lb. of ſugar coſt 2s. 9d. what is the value of 18lb.? Anſwer, 12s. 4½d.

Work.

lb. s. d. lb.
4 — 2 : 9 — 18
12
33 d.
18
264
33
4|594|148 d.
2
4.
4|8|12 farthings.

Expl. The ſuppoſition is in 4lb. and 2s. 9d. this laſt term being like the thing ſought, which is connected with 18lb. wherefore the terms are ſtated according to the rule: then the middle term being mixed, it is to be reduced to pence, and then argue thus; if 4lb. coſt 33d. 18lb. muſt coſt more; therefore multiply 33d. by 18lb. and divide their product

product by 4; the quotient is 148 d. and 2 remains, which is to be reduced to farthings, and the product divided by the former quotient, gives 2; ſo the anſwer is 148 d. 2 farthings, or 12 s. 4½ d. becauſe 148 d. is, by reduction, 12 s. 4 d. Queſt. III. What is the price of 50 lb. of tobacco, when 32 lb. 12 oz. coſt 4 l. 10 s.? Anſw. 6 l. 17 s. 4¾ d.

Work.

lb. oz. l. s. lb. oz. s. oz.
32 : 12 — 4 : 10 — 50 524 — 90 — 800
16 20 16 800
194 90 300 524|72000|137 s.
33 50 524
524 800 1960
1572
3880
3668
Remainder 212
12
524|2544|4 d.
2096
Remainder 448
4
524|1792|3 220/524 q.
1572
220

Queſt. IV. What are 5 yards of ribband worth, whereof 63 yards 2 quarters coſt 5 l.? Anſw. 7 s. 10 d. 1 242/254 q.

Work.

yds. qrs. l. yds.
63 . 2 — 5 — 5
4 4
254qs. — 5 — 20 qrs.
20
100
20
254|2000|7 s.
1778
Rem. 222
12
254|2664|10 d.
254
124
4
254|496|1 242/254 q.
254
242

Explanation. The terms ſtated, and reduced according to the rule, I find the anſwer ought to be leſs than the middle term; therefore I multiply 5 l. by 20 quarters, but the product is leſs than the diviſor; and ſo it is to be reduced to ſhillings, which makes 2000 s. this divided by 254, quotes 7 s. The reſt of the work is plain.

Queſt. V. What time will 7 men be boarded for 25 l. when 3 men paid 25 l. for 6 months? Anſw. 2 months 16 days, reckoning 28 days to 1 month.

Work.

men. mths. men.
3 — 6 — 7
3
7|18|2 months.
14
Rem. 4
28
7|112|16 days.

Explanation. The 25 l. is a ſuperfluous number; then the ſuppoſition is in the 3 men and 6 months, and the demand regards the 7 men: the terms being all ſimple, you are to argue thus; if 3 men are boarded 6 months for 25 l. (or any ſum), 7 men will be boarded for the ſame a ſhorter time: therefore multiply 6 months by 3, and divide the product 18 by 7, whereby the anſwer is found to be 2 months and 16 days.

Queſt. VI. If the carriage of 3 hundred weight coſt 10 s. for 40 miles, how much ought to be carried for the ſame price 25 miles and 3 quarters? Anſw. 4 cwt. 2 qr. 17 97/103 lb.

Work.

M. Cwt. M. qr.
40 — 3 — 25 : 3
4 4
160 — 3 — 103
160
103|480|4 Cwt.
412
Rem. 68
4
103|272|2 qrs.
206
Rem. 66
28
528
132
103|1848|17 97/103 lb.
103
818
721
97

Explanation. The ſuperfluous number here is 10 s. and from the other three terms ſtated and reduced, it is argued thas; if 3 Cwt. is carried 160 quarters of a mile for 10 s. then a greater weight will be carried for the ſame price 103 qrs. of a mile; therefore multiply 3 by 160, and divide the product 480 by 103, the anſwer is 4 Cwt. 2 quarters 17 97/103 lb.

Note. The firſt four queſtions are what is called the rule of three direct, that is, where the third term being greater or leſſer than the firſt, requires that the anſwer alſo be greater or leſſer than the ſecond term. The two laſt queſtions are of the rule of three indirect, or reverſe: where the third term being greater or leſſer than the firſt, requires the fourth contrarily leſſer or greater than the ſecond. But we have comprehended both

in

in one general rule. And from this obſervation may be learned what queſtions are of either kind.

RULE, in a monaſtic ſenſe, a ſyſtem of laws or regulations, whereby religious houſes are governed, and which the religious make a vow, at their entrance, to obſerve. Such are the rules of the auguſtins, benedictins, carthuſians, franciſcans, &c. See AUGUSTINS, &c.

RULES *of Court*, in law, are certain orders made, from time to time, in the courts of law, which attornies are bound to obſerve, in order to avoid confuſion; and both the plaintiff and defendant are at their peril alſo bound to pay obedience to rules made in court relating to the cauſe depending between them.

It is to be obſerved, that no court will make a rule for any thing that may be done in the ordinary courſe; and that if a rule be made, grounded upon an affidavit, the other ſide may move the court againſt it, in order to vacate the ſame, and thereupon ſhall bring into court a copy of the affidavit and rule. On the breach and contempt of a rule of court an attachment lies; but it is not granted for diſobedience to a rule when the party has not been perſonally ſerved; nor for diſobeying a rule made by a judge in his chamber, which is not of force to ground a motion upon, unleſs the ſame be entered.

A rule of court is granted every day the courts at Weſtminſter ſit, to priſoners of the king's bench, or fleet, priſons, to go at large about their private affairs.

RULE, or RULER, an inſtrument of wood or metal, with ſeveral lines delineated on it, of great uſe in practical menſuration.

When a ruler has the lines of chords, tangents, ſines, &c. it is called a plane ſcale. See the article SCALE.

The carpenter's joint-rule is an inſtrument uſually of box, &c. twenty-four inches long, and one and a half broad; each inch being ſubdivided into eight parts. On the ſame ſide with theſe diviſions, is uſually added Gunter's line of numbers. On the other ſide, are the lines of timber and board-meaſure; the firſt beginning at 82, and continued to 36, near the other end; the latter is numbered from 7 to 36, 4 inches from the other end.

Uſe of the carpenter's joint-RULE. The application of the inches, in meaſuring lengths, breadths, &c. is obvious. That of the Gunter's line, ſee under GUNTER's *Line*.

The uſe of the other ſide is all we need here meddle with: 1. The breadth of any ſurface, as board, glaſs, &c. being given, to find how much in length makes a ſquare foot. Find the number of inches the ſurface is broad, in the line of broad-meaſure, and right againſt it is the number of inches required. Thus, if the ſurface were eight inches broad, eighteen inches will be found to make a ſuperficial foot. Or more readily thus: Apply the rule to the breadth of the board, or glaſs, that end, marked 36, being equal with the edge, the other edge of the ſurface will ſhew the inches, and quarters of inches, which go to a ſquare foot. 2. Uſe of the table at the end of the board-meaſure. If a ſurface be one inch broad, how many inches long will make a ſuperficial foot? look in the upper row of figures for one inch, and under it in the ſecond row is twelve inches, the anſwer to the queſtion. 3. Uſe of the line of timber-meaſure. This reſembles the former; for having learned how much the piece is ſquare, look for that number on the line of the timber-meaſure; the ſpace thence to the end of the rule is the length which, at that breadth, makes a foot of timber. Thus, if the piece be nine inches ſquare, the length neceſſary to make a ſolid foot of timber, is 21 $\frac{1}{3}$ inches. If the timber be ſmall, and under nine inches ſquare, ſeek the ſquare in the upper rank of the table, and immediately under it is the feet and inches that make a ſolid foot. If the piece be not exactly ſquare, but broader at one end than the other, the method is to add the two together, and take half the ſum for the ſide of the ſquare. For round timber the method is to girt it round with a ſtring, and to allow the fourth part for the ſide of the ſquare; but this method is erroneous, for hereby you loſe nearly one fifth of the true ſolidity; though this is the method at preſent practiſed in buying and ſelling timber.

The maſon's rule is twelve or fifteen feet long, in order to be applied under the level to regulate the courſes, and make the piedroits equal, &c.

Everard's ſliding RULE, has already been deſcribed under the article GAUGING.

Coggeſhal's ſliding RULE, is chiefly uſed for meaſuring the ſuperficies and ſolidity of timber, &c. It conſiſts of two rulers, each a foot long, one of which ſlides in a groove made along the middle of the other.

other, as represented in plate CCXXXIV. fig. 4.

On the sliding side of the rule are four lines of numbers, three whereof are double; that is, are lines to two radiuses; and one, a single broken line of numbers: the three first, marked A, B, C, are figured 1, 2, 3, &c. to 9; then 1, 2, 3, &c. to 10; their construction, use, &c. being the same as those of Everard's sliding rule. The single line, called the girt-line, and marked D, whose radius is equal to the two radiuses of any of the other lines, is broke for the easier measurement of timber, and figured 4, 5, 6, 7, 8, 9, 10, 20, 30, &c. From 4 to 5 it is divided into ten parts, and each tenth subdivided into 2, and so on, from 5 to 6, &c.

On the backside of the rule are, 1. A line of inch-measure, from 1 to 12; each inch being divided and subdivided. 2. A line of foot measure, consisting of one foot, divided into 100 equal parts, and figured 10, 20, 30, &c. The back part of the sliding piece is divided into inches, halves, &c. and figured from 12 to 24; so that, when drawn wholly out, there may be a measure of two feet.

Use of Coggeshal's RULE *for measuring plane superficies.* 1. To measure a square: suppose, for instance, each of the sides 5 feet; set 1 on the line B, to 5 on the line A; then against 5 on the line B is 25 feet, the content of the square on the line A. 2. To measure a long square. Suppose the longest side 18 feet, and the shortest 10; set 1 on the line B, to 10 on the line A; then against 18 feet, on the line B, is 180 feet, the contents on the line A. 3. To measure a rhombus. Suppose the side 12 feet, and the length of a perpendicular let fall from one of the obtuse angles, to the opposite side, 9 feet; set 1 on the line B, 12, the length of the side on the line A; then against 9, the length of the perpendicular on the line B, is 108 feet, the content. 4. To measure a triangle. Suppose the base 7 feet, and the length of the perpendicular let fall from the opposite angle to the base 4 feet; set 1 on the line B, to 7 on the line A; then against half the perpendicular, which is 2 on the line B, is 14 on the line A, for the content of the triangle. 5. To find the content of a circle, its diameter being given. Suppose the diameter 3.5 feet; set 11 on the girt line D, to 95 on the line C; then against 3.5 feet on D is 9.6 on C, which is the content of the circle in feet. 6. To find the content of an oval or ellipsis. Suppose the longest diameter 9 feet, and the shortest 4. Find a mean proportional between the two, by setting the greater 9 on the girt line, to 9 on the line C; then against the less number 4 on the line C is 6, the mean proportional sought. This done, find the content of a circle, whose diameter is 6 feet; this, when found, by the last article, will be equal to the content of the ellipsis sought.

Use of Coggeshal's RULE, *in measuring timber.* 1°. To measure timber the usual way. Take the length in feet, half feet, and, if required, quarters; then measure half way back again; then girt the tree with a small cord or line; double this line twice very evenly, and measure this fourth part of the girt or perimeter, in inches, halves, and quarters. The dimensions thus taken, the timber is to be measured as if square, and the fourth of the girt taken for the side of the square, thus; set 12 on the girt line D, to the length in feet on the line C; then against the side of the square, on the girt-line D, taken in inches, you have, on the line C, the content of the tree in feet. For an instance: suppose the girt of a tree, in the middle, be 60 inches, and the length 30 feet, to find the content, set 12 on the girt-line D, and 30 feet on the line C; then against 15, one fourth of 60, on the girt line D, is 46.8 feet, the content on the line C. If the length should be 9 inches, and the quarter of the girt 35 inches; here, as the length is beneath a foot, measure it on the line of foot-measure, and see what decimal part of a foot it makes, which you will find .75. Set 12, therefore, on the girt-line, to 75 on the first radius of the line C, and against 35 on the girt-line is 64 feet on C, for the content. 2°. To measure round timber the true way. The former method, though that generally in use, is not quite just. To measure timber accurately, instead of the point 12 on the girt-line, use another, *viz.* 10.635; at which there should be placed a center-pin. This 10.635 is the side of a square equal to a circle, whose diameter is 12 inches. For an instance: suppose the length 15 feet, and $\frac{1}{4}$ of the girt 42 inches, set the point 10.635 to 15, the length; then against 42 on the girt line is 233 feet for the content sought; whereas, by the common way, there arises only

184 feet. In effect, the common measure is only to the true measure, as 11 to 14.

3°. To measure a cube. Suppose the sides to be 6 feet each; set 12 on the girt-line D, to 6 on C; then against 72 inches (the inches 6 feet) on the girt-line, is 216 feet on C, which is the content required. 4°. To measure unequally-squared timber; that is, where the breadth and depth are not equal. Measure the length of the piece, and the depth (at the end) in inches: then find a mean proportional between the breadth and depth of the piece. This mean proportional is the side of a square, equal to the end of the piece; which found, the piece may be measured as square timber. For an instance: let the length of the piece of timber be 13 feet, the breadth 23 inches, and the depth 13 inches; set 23 on the girt-line D, to 23 on C; then against 13 on C is 17.35 on the girt-line D, for the mean proportional. Again, setting 12 on the girt-line D, to 13 feet, the length of the line C; against 17.35 on the girt line is 27 feet, the content. 5°. To measure taper timber. The length being measured in feet, note one-third of it; which is found thus: set 3 on the line A, to the length on the line B; then against 1 on A is the third part on B: then, if the solid be round, measure the diameter at each end in inches, and subtract the less diameter from the greater; add half the difference to the less diameter; the sum is the diameter in the middle of the piece. Then set 13.54 on the girt to the length of the line C, and against the diameter in the middle on the girt-line is a fourth number on the line C. Again, set 13.54 on the girt line to the third part of the length on the line C; then against half the difference on the girt-line is another fourth number on the line C; these two fourth numbers, added together, give the content. For an instance: let the length be 27 feet (one third whereof is 9) the greater diameter 22 inches, and the lesser 18; the sum of the two will be 40, their difference 4, and half the difference 2, which, added to the less diameter, gives 20 inches for the diameter in the middle of the piece. Now set 13.54 on the girt-line, to 27 on the line C, and against 20 on D is 58.9 feet. Again, set 13.54 of the girt-line to 9 on the line C; and against 2 on the girt line (represented by 20) is .196 parts; therefore, by adding 58.9 feet to .196 feet, the sum is 59.096 feet, the content.

If the timber be square, and have the same dimensions; that is, the length 27 feet, the side of the greater end 22 inches, and that of the lesser 18 inches; to find the content, set 12 on the girt-line to 27, the length on the line C, and against 20 inches, the side of the mean square on the girt-line, is 75.4 feet. Again, set 12 on the girt-line to 9 feet, one-third of the length, on the line C, and against 2 inches, half the difference of the sides of the squares of the ends on the girt-line, is .25 parts of a foot; both together make 75.65 feet, the content of the solid.

The girt or circumference of a tree, or round piece of timber given; to find the side of the square within, or the number of inches of a side, when the round timber is squared. Set 10 on A to 9 on B, then against the girt on A are the inches for the side of a square on the line B.

RUM, a species of brandy, or vinous spirit, distilled from sugar canes. See BRANDY, DISTILLATION, and SPIRIT.

Rum, according to Dr. Shaw, differs from simple sugar-spirit, in that it contains more of the natural flavour or essential oil of the sugar-cane; a great deal of raw juice and parts of the cane itself being often fermented in the liquor, or solution, of which the rum is prpared. The unctuous or oily flavour of rum is often supposed to proceed from the large quantity of fat used in boiling the sugar; which fat, indeed, if coarse, will usually give a stinking flavour to the spirit, in our distillations of the sugar-liquor, or wash, from our refining sugar-houses; but this is nothing of kin to the flavour of the rum, which is really the effect of the natural flavour of the cane.

The method of making rum is this: When a sufficient stock of the materials is got together, they add water to them, and ferment them in the common method, though the fermentation is always carried on very slowly at first; because, at the beginning of the season for making rum in the islands, they want yeast, or some other ferment to make it work; but by degrees, after this, they procure a sufficient quantity of the ferment, which rises up as a head to the liquor in the operation, and thus they are able afterwards to ferment and make their rum with a great deal of expedition, and in large quantities.

When

When the wash is fully fermented, or to a due degree of acidity, the distillation is carried on in the common way, and the spirit is made up proof: though sometimes it is reduced to a much greater strength, nearly approaching to that of alcohol or spirit of wine, and it is then called double distilled rum. It might be easy to rectify the spirit, and bring it to much greater purity than we usually find it to be of; for it brings over in the distillation a very large quantity of the oil; and this is often so disagreeable, that the rum must be suffered to lie by a long time to mellow before it can be used; whereas, if well rectified, it would grow mellow much sooner, and would have a much less potent flavour.

The best state to keep rum in, both for exportation and other uses, is doubtless that of alcohol, or rectified spirit. In this manner it would be transported in one half the bulk it usually is, and might be let down to the common proof-strength with water when necessary: for the common use of making punch, it would likewise serve much better in the state of alcohol; as the taste would be cleaner; and the strength might always be regulated to a much greater exactness than in the ordinary way.

The only use to which it would not so well serve in this state, would be the common practice of adulteration among our distillers; for when they want to mix a large portion of cheaper spirit with the rum, their business is to have it of the proof strength, and as full of the flavouring oil as they can, that it may drown the flavour of the spirits they mix with it, and extend its own. If the business of rectifying rum was more nicely managed, it seems a very practicable scheme to throw out so much of the oil, as to have it in the fine light state of a clear spirit, but lightly impregnated with it; in this case it would very nearly resemble arrac, as is proved by the mixing a very small quantity of it with a tasteless spirit, in which case the whole bears a very near resemblance to arrac in flavour.

Rum is usually very much adulterated in England; some are so barefaced as to do it with malt-spirit; but when it is done with molasses-spirit, the tastes of both are so nearly allied that it is not easily discovered. The best method of judging of it is, by setting fire to a little of it; and when it has burnt away all the inflammable part, examining the phlegm both by the taste and smell.

Rum, on importation, pays a duty of of 4s. $\frac{80\frac{5}{21}}{100}$d. the gallon.

RUMB, or RHUMB. See RHUMB.

RUMELIA, in geography, the same with antient Greece, now a part of Turky in Europe. See TURKY.

RUMEN, in comparative anatomy, the paunch, or first stomach of such animals as chew the cud, thence called ruminant animals.

The rumen is by far the largest of all the stomachs, and in it the whole mass of crude aliments, both solid and liquid, lies and macerates, to be thence transmitted to the mouth to be again chewed, comminuted, and fitted for farther digestion in the other ventricles. See the article DIGESTION.

The ruminant animals, Mr. Ray observes, are all hairy quadrupeds, viviparous, and have four stomachs; they also want the dentes primores, or broad teeth in the fore part of the upper jaw, and are furnished with that kind of fat called suet, sebum. See QUADRUPED.

We even find instances of ruminating men, particularly of one at Bristol, of of whom Dr. Slare gives the following account, in Phil. Trans. n° 193. He would begin to chew his meat over again within a quarter of an hour after his meals, if he drank upon them; if not, it was somewhat longer: this chewing after a a full meal lasted about an hour and an half. The victuals, upon their return into the mouth, tasted somewhat more pleasant than at first; and liquids, as broths and spoon-meats, returned all one as dry and solid food; and he always observed, that if he eat variety of things, what he swallowed first, would again come up first to be chewed; also if this faculty intermitted at any time, it portended sickness, and he was never well till it returned again.

RUMEX, in botany, a genus of the *hexandria-tryginia* class of plants, the flower of which consists of three connivent petals, of an oval figure: the seed is single, triquetrous, and contained in the corolla.

To this genus, among other species, belong rhubarb, bloody dock, common sorrel, &c. See the articles RHUBARB, DOCK, and SORREL.

RUMFORD, a market-town of Essex, ten miles east of London.

RUM-

RUMMAGE, in the ſea language, ſignifies to clear a ſhip's hold, or to remove goods from one place of it to another.

RUMPFIA, in botany, a genus of the *triandria-monogynia* claſs of plants, the corolla of which conſiſts of three oblong, obtuſe, and equal petals; its fruit is a coriaceous and turbinated drupe, with three furrows; and incloſing an oval trilocular nut, with a ſingle triquetrous kernel in each cell.

RUMSEY, a market-town of Hampſhire, nine miles ſouth weſt of Wincheſter.

RUN, in the ſea language, denotes ſo much of a ſhip's hull, as is under water.

RUNDLE, or ROUNDLE, in heraldry, the ſame with pellet. See PELLET.

RUNDLET, or RUNLET, a ſmall veſſel, containing an uncertain quantity of any liquor, from three to twenty gallons.

RUNIC, a term applied to the language and letters of the antient Goths, Danes, and other northern nations.

RUNNER, in the ſea language, a rope belonging to the garnet, and to the two bolt-tackles. It is reeved in a ſingle block, joined to the end of a pennant, and has at one end a hook to hitch into any thing, and at the other end a double block, into which is reeved the fall of the tackle, or the garnet, by which means it purchaſes more than the tackle would without it.

RUNNET, or RENNET, the acid juice found in the ſtomachs of calves that have fed on nothing but milk, and are killed before the digeſtion is perfect.

RUNNING *of goods*, a clandeſtine landing of goods, without paying the legal cuſtoms or duties for the ſame.

RUNNING ROPES. See ROPE.

RUPEE, ROUPIA, or ROUPIAS, names of a gold and ſilver coin, current in the Eaſt-Indies. See COIN.

RUPELMONDE, a town of Flanders, ſituated on the river Scheld, ſix miles ſouth of Antwerp. See RUPPLE.

RUPERT-FORT, a ſettlement belonging to the Hudſon's-Bay company, ſituated at the bottom of the ſaid bay, in weſt long. 80°, north lat. 51°.

RUPICAPRA, in zoology, the CHAMOIS-GOAT. See CHAMOIS and GOAT.

RUPPIA, in botany, a genus of the *tetrandia-tetragynia* claſs of plants, without any flower-petals: there are no ſtamina, the antheræ being foſſile: the fruit conſiſts of four oval, cortical ſubſtances, pointed, and ſtanding on the elongated ſtyles, and in each is contained a ſingle roundiſh ſeed.

RUPPLE, a river of Brabant, which, formed by Senne, Demer, and Dyle, falls into the Scheld at Rupelmond.

RUPTURE, in ſurgery, the ſame with hernia. See the article HERNIA.

RURAL, or RUSTIC, in general, denotes ſomething that relates to the country.

RURAL DEAN, in church-hiſtory. See the article DEAN.

RUSCUS, BUTCHER'S BROOM, in botany, a plant of the *dioecia-ſyngeneſia* claſs, with a globoſe monopetalous flower; and a globoſe trilocular berry for its fruit, with two ſeeds of the ſame ſhape in each cell. The root of this plant is one of the five aperient roots of the ſhops; being eſteemed a powerful attenuant and reſolvent, and therefore good in all chronic caſes and obſtructions of the viſcera, as alſo to promote urine.

RUSH, *juncus*, in botany. See JUNCUS.

RUSMA, in the materia medica, the ſame with ſory. See the article SORY.

RUSSIA, or MUSCOVY, a large empire, comprehending a vaſt extent of country, in the moſt northerly parts of Europe and Aſia, from 24° to 130°, eaſt long, and between 45° and 72° north lat.

Its capital cities are Moſcow and Peterſburg. See the articles MOSCOW and PETERSBURG.

RUSSIA-COMPANY, in commerce. See the article COMPANY.

RUST *of a metal*, the flower or calx thereof, procured by corroding and diſſolving its ſuperficial parts by ſome menſtruum. Water is the great inſtrument or agent in producing ruſt; and hence oils, and other fatty bodies, ſecure metals from ruſt; water being no menſtruum to oil, &c. and therefore not able to make its way through it.

All metals are liable to ruſt, even gold itſelf, if expoſed to the fumes of ſea ſalt.

RUST, or BLIGHT *of Corn*. See BLIGHT.

RUSTIC, in architecture, implies a manner of building in imitation of nature, rather than according to the rules of art.

RUSTIC WORK, is where the ſtones in the face, &c. of a building, inſtead of being ſmooth, are hatched, or picked with the point of a hammer.

RUSTIC ORDER, that decorated with ruſtic quoins, ruſtic work, &c.

RUSTRE, in heraldry, a bearing of a diamond-ſhape, pierced through in the

middle with a round hole. See plate CCXXXIII. fig. 4.

RUT, in hunting, the venery or copulation of deer. See DEER.

RUTA, RUE, in botany, a genus of the *decandria monogynia* claſs of plants, with a roſaceous flower, uſually conſiſting of four patent and hollow petals; its fruit conſiſts of four capſules affixed to an axis, or rather one gibbous capſule, with four lobes, and as many cells, in which are incloſed a great many kidney-ſhaped and angular ſeeds. See plate CCXXXV. fig. 1.

The dried herb is much uſed in medicine, by way of infuſion; being eſteemed an excellent alexipharmic and cephalic, and accordingly preſcribed in the ſmall-pox, meaſles, and hyſteric and nervous caſes; as alſo in peripneumonies and pleuriſies, to ſtrengthen the ſtomach, and to prevent the return of habitual colics.

Goat RUE, *galega*, a plant of the *diadelphia decandria* claſs, with a papilionaceous flower, and a long cylindric pod for its fruit.

It has been accounted a good ſudorific, but is little uſed in the preſent practice.

Meadow-RUE, *thalictrum*. See the article THALICTRUM.

Wall RUE, *ruta-muraria*, the ſame with the adiantum album. See the article ADIANTUM.

Wild-RUE, *harmala*, or *peganum*. See the article PEGANUM.

RUTHYN, a market-town of Denbighſhire, eight miles ſouth-eaſt of Denbigh.

RUTICILLA, in ornithology, a bird called in engliſh the Redſtart. See the article REDSTART.

RUTILUS, in ichthyology, a fiſh called in engliſh the Roach. See ROACH.

RUTLAND, the leaſt county in England, bounded by Lincolnſhire, on the north-eaſt; by Northamptonſhire, on the ſouth-eaſt; and by Leiceſterſhire, on the weſt and north-weſt.

RUVO, a town of the kingdom of Naples, ſeventeen miles ſouth-weſt of Barri.

RYAL, or RIAL. See RIAL.

RYE, *ſecale*, in botany. See SECALE.

Rye ſucceeds very well on any ſort of dry land, even on the moſt barren gravel or ſand. The farmers ſow it about the beginning of September, after a ſummer's fallow, in the drieſt time they can. Two buſhels of ſeed is the quantity generally allowed to an acre of land; but if it be ground newly broken up, or if it be ſubject to worms, they then allow a peck more to the acre. A little ſprinkling of dung, or mud, upon rye-land, will greatly advance the crop, though it is laid but half the thickneſs that it is for other corn; its produce is commonly about twenty buſhels upon an acre.

RYE, in geography, a borough and port-town of Suſſex, ſituated on a bay of the engliſh Channel, ſixty miles ſouth-eaſt of London. It ſends two members to parliament.

RYEGATE, or REYGATE. See the article REYGATE.

RYME, or RHYME. See RHYME.

RYPEN, a city and port-town of Jutland, in Denmark: eaſt long. 9°, north lat. 55° 30'.

RYSAGON, a name given to the caſſumunar-root. See CASSUMUNAR.

RYSWICK, a fine village in Holland, between the Hague and Delft, where the peace in 1697 was concluded.

RZECZICA, a city of Lithuania, in Poland, ſituated on the river Nieper, eaſt long. 30°, north lat. 53°.

S.

S, or s, the eighteenth letter, and fourteenth conſonant of our alphabet; the ſound of which is formed, by driving the breath through a narrow paſſage between the palate and the tongue elevated near it, together with a motion of the lower jaw and teeth towards the upper; the lips being a little way open, with ſuch a configuration of every part of the mouth and larynx, as renders the voice ſomewhat ſibulous and hiſſing. Its ſound however varies, being ſtrong in ſome words, as *this, thus, &c.* and ſoft in words which have a final e, as *muſe, wiſe, &c.* It is generally doubled at the end of words, whereby they become hard and harſh, as in *kiſs, loſs, &c.* In ſome words it is ſilent, as *iſle, iſland, viſcount, &c.* In writing or printing, the long character ſ, is uſed at the beginning and middle of words, but the ſhort s, at the end.

In abbreviations, S, ſtands for *ſocietas* or *ſocius*; as, R. S. S. for *regiæ ſocietatis ſocius*, i. e. fellow of the royal ſociety. In medicinal preſcriptions, S. A. ſignifies *ſecundum artem*, i. e. according to the rules of art; and in the notes of the antients, S ſtands for *Sextus*; SP. for *Spurius*; S C. for *ſenatus conſultum*; S. P. Q. R. for *ſenatus populuſque Romanus*; S. S. S. for *ſtratum ſuper ſtratum*, i. e. one layer above another alternately; S. V. B. E. E. Q. V. for *ſi vales bene eſt, ego quoque valeo*, a form uſed in Cicero's time, in the beginning of letters. Uſed as a numeral, S antiently denoted ſeven; in the italian muſic, S ſignifies ſolo; and in books of navigation, S ſtands for ſouth; S. E. for ſouth-eaſt; S. W. for ſouth-weſt; S. S. E. for ſouth ſouth-eaſt; S. S. W. for ſouth ſouth-weſt, *&c.* See COMPASS.

SABA, one of the Caribbee iſlands, ſubject to the Dutch: weſt long. 63°, north lat. 18°.

SABÆANS, in church-hiſtory, a ſet of idolaters, much antienter than the jewiſh law.

In the early ages of the world, idolatry was divided between two ſects; the worſhippers of images called ſabæans, or ſabians, and the worſhippers of fire called magi. See the article MAGI.

The ſabæans began with worſhipping the heavenly bodies, which they fancied were animated by inferior deities. In the conſecration of their images, they uſed many incantations to draw down into them from the ſtars thoſe intelligences, for whom they erected them, whoſe power and influence they held afterwards dwelt in them. This religion, it is ſaid, firſt began among the Chaldæans, with their knowledge in aſtronomy: and from this it was, that Abraham ſeparated himſelf, when he came out of Chaldæa. From the Chaldæans it ſpread all over the eaſt; and from thence to the Grecians, who propagated it to all the nations of the known world. The remainder of this ſect ſtill ſubſiſts in the eaſt, and pretend to derive their name from Sabius, a ſon of Seth; and among the books in which the doctrines of this ſect are contained, they have one which they call the book of Seth, and which they pretend was written by that patriarch.

SABBATH, or the day of reſt, a ſolemn feſtival of the Jews, on the ſeventh day of the week, or Saturday, beginning from ſun-ſet on Friday, to ſun-ſet on Saturday.

The obſervation of the ſabbath began with the world: for God having employed ſix days in its creation, appointed the ſeventh, as a day of reſt to be obſerved by man, in commemoration of that great event. On this day the Jews were commanded to abſtain from all labour, and to give reſt to their cattle. They were not allowed to go out of the city farther than two thouſand cubits, or about a mile; a cuſtom which was founded on the diſtance of the ark from the tents of the Iſraelites, in the wilderneſs, after their leaving Egypt; for being permitted to go, even on the ſabbath-day, to the tabernacle to pray, they from thence inferred, that the taking a journey of no greater length, though on a different account, could not be a breach of the ſabbatical reſt.

As the ſeventh day was a day of reſt to the people, ſo was the ſeventh year to the land; it being unlawful in this year to plow or ſow, and whatever the earth produced, belonged to the poor; this was called the ſabbatical year. The Jews, therefore, were obliged, during the ſix years, and more eſpecially the laſt, to lay up a ſufficient ſtore for the ſabbatical year.

The modern, as well as the antient, Jews, are very ſuperſtitious in the obſervance of the ſabbath; they carry neither arms, nor gold, nor ſilver about them, and are permitted neither to touch theſe, nor a candle, nor any thing belonging to the fire; on which account they light up lamps on Friday, which burn till the end of the ſabbath.

There is at preſent a ſect of baptiſts called ſabbatarians, from their obſerving the ſeventh day of the week, as a day ſet apart for the worſhip of God: they attempt to juſtify this practice by alledging that the jewiſh ſabbath was never abrogated in the New Teſtament; and that where God has given a command, it is our duty to obſerve it till he has abrogated or altered it by a new command. See the article SUNDAY.

SABELLIANS, a ſect of chriſtians of the IIId century, that embraced the opinions of Sabellius, a philoſopher of Egypt, who openly taught that there is but one perſon in the Godhead.

The ſabellians maintained, that the Word and the Holy Spirit are only virtues, emanations, or functions of the Deity; and held, that he who is in heaven is the father of all things, deſcended into the virgin, became a child, and was born of her as a ſon; and that having accompliſhed the myſtery of our ſalvation, he diffuſed himſelf on the apoſtles in tongues of fire, and was then denominated the Holy Ghoſt. This they explained by reſembling God to the ſun, the illuminative virtue or quality of which was the Word, and its warming virtue the Holy Spirit. The Word, they taught, was darted, like a divine ray, to accompliſh the work of redemption; and that, being reaſcended to heaven, the influences of the Father were communicated after a like manner to the apoſtles.

SABINA, SAVIN, in botany. See SAVIN.

SABINA, a province of Italy, in the pope's territories, bounded by Umbria on the north, by Naples on the eaſt, by the Campania of Rome on the ſouth, and by St. Peter's Patrimony on the weſt.

SABLE, or SABLE ANIMAL, in zoology, a creature of the weaſel-kind, called by authors muſtela zibellina. See the articles MUSTELA and ZIBELLINA.

SABLE, in heraldry, denotes the colour black, in coats of arms belonging to gentlemen; but in thoſe of noblemen it is called diamond; and in thoſe of ſovereign princes, ſaturn. See COLOUR.

It is expreſſed in engraving by perpendicular and horizontal hatches croſſing one another, as repreſented in pl. CCXXXV. fig. 5.

SABLE-MOUSE, a name given to the norway rat. See the article NORWAY.

SABLE, in geography, a town of Orleanois in France, twenty miles north of Angers.

SABLUSTAN, a province of Perſia, which, comprehending Gaur and Candahor, is bounded by Choraſſan on the north, by India on the eaſt, and by Sigiſtian on the ſouth.

SABRE, a kind of ſword or ſcimiter, with a very broad and heavy blade, thick at the back, and a little falcated or crooked towards the point: it is the ordinary weapon worn by the Turks, who are ſaid to be very expert in the uſe of it.

SABURRÆ, GRITTS, in natural hiſtory, a genus of foſſils, found in minute maſſes, forming together a kind of powder, the ſeveral particles of which are of no determinate ſhape, nor have any tendency to the figure of cryſtal, but ſeem rudely broken fragments of larger maſſes; not to be diſſolved or diſunited by water, but retaining their figure in it, and not cohering by means of it into a maſs; conſiderably opake, and in many ſpecies fermenting with acids; often fouled with heterogene matters, and not unfrequently taken in the coarſer ſtony and mineral or metalline particles.

Gritts are of various colours, as, 1. The ſtony and ſparry gritts, of a bright or greyiſh white colour. 2. The red ſtony gritts. 3. The green ſtony gritts, compoſed of homogene ſparry particles. 4. The yellow gritt, of which there is only one ſpecies. 5. The black and blackiſh gritts, compoſed of ſtony or talcy particles.

SAC, in law, is ſaid to be an antient privilege, which the lord of a manor claims of holding his court, in cauſes of treſpaſs among his tenants, and impoſing fines for the ſame. See COURT and MANOR.

SACCADE, in the manege, is a jerk more or leſs violent, given by the horſeman to the horſe, in pulling or twitching the reins of the bridle all on a ſudden, and with one pull, and that when a horſe lies heavy upon the hand, or obſtinately arms himſelf.

This is a correction uſed to make a horſe carry well, but it ought to be uſed diſcreetly, and but ſeldom.

SACCAI, a city and port-town of Japan, ſituated on the bay of Mecao, three hundred

hundred miles ſouth-weſt of Jeddo: eaſt long. 135°, and north lat. 36°.

SACCHARUM, SUGAR, in botany. See the article SUGAR.

SACCHARUM SATURNI, SUGAR OF LEAD, is thus ordered to be made in the London Diſpenſatory: boil ceruſs with diſtilled vinegar, until the vinegar becomes ſufficiently ſweet; then filter the vinegar thro' paper, and after due evaporation ſet it to cryſtallize.

Some have ventured to give ſugar of lead internally, in doſes of a few grains, as a ſtyptic, in hæmorrhages, profuſe colliquative ſweats, ſeminal fluxes, the fluor albus, &c. and indeed it muſt be allowed, that it very powerfully reſtrains the diſcharge; but then it occaſions other ſymptoms, often dangerous, and ſometimes fatal, as violent colic-pains, obſtinate conſtipations, cramps, tremors, &c. ſo that its internal uſe ſeems by no means innocent.

SACCO BENITO. See INQUISITION and ACT *of faith*.

SACCULUS, in anatomy, a diminutive of ſaccus, ſignifies a little bag: as, 1. The ſacculus lachrymalis, which is a little bag, into which the punctа lacrymalia of the eye open. 2. The ſacculus cordis, or pericardium. 3. The ſacculus chyliferus, the beginning of the thoracic duct, more uſually called receptaculum chyli. 4. Sacculi adipoſi, or the adipoſe cells, &c. See the article EYE, PERICARDIUM, RECEPTACULUM, &c.

A topical application, incloſed in a linnen-bag, is alſo termed ſacculus medicinalis; as is a bag filled with medicinal ſimples, and ſuſpended in a liquor, in order to make a diet-drink.

SACCUS JUGULARIS, the JUGULAR SACK, in anatomy, a receptacle formed at the termination of the internal jugular vein; the uſe of which is to bring back the blood from the ſinuſes of the dura mater, and from the brain. See the article JUGULAR and BRAIN.

SACER, in its common acceptation, ſignifies ſacred, or holy; but is alſo uſed to expreſs dreadful, horrid, or execrable: and in this laſt ſenſe Virgil calls the love of gold, *auri ſacra fames*.

It is uſed by medical writers in both theſe ſignifications: thus they call hiera picra, the ſacred tincture; a malignant kind of eryſipelas, ignis ſacer; and the epilepſy, morbus ſacer. See the articles HIERA, ERYSIPELAS, and EPILEPSY.

Some give the name ſacer muſculus to a muſcle called by Winſlow tranſverſo-ſpinalis lumborum: it is compoſed of ſeveral ſmall ones, and lies between the ſpinal and oblique apophyſes of the loins, reaching to the os ſacrum.

SACER, in ornithology, the engliſh name for the blue-legged falcon, with a duſky ferrugineous back. See FALCO.

This is a very large but not a very beautiful ſpecies of falco; it is of the ſize of a full-grown hen. It is a very ſwift flier, and ſo bold that there is ſcarce any bird it will not ſeize upon. The head is large and rounded; the beak is ſhort, broad at the baſe, and hooked at the point; the opening of the mouth is very wide, and the ſwallow remarkably large; the body is longer, as are alſo the wings and tail, than in moſt other ſpecies.

SACERDOTAL, ſomething belonging to prieſts. See the article PRIEST.

SACK *of wool*, a quantity of wool containing juſt twenty-two ſtone, and every ſtone fourteen pounds. In Scotland, a ſack is twenty-four ſtone, each ſtone containing ſixteen pounds.

SACK *of cotton-wool*, a quantity from one hundred and a half to four hundred weight.

SACKS *of earth*, in fortification, are canvas-bags filled with earth. They are uſed in making retrenchments in haſte, to place on parapets, or the head of the breaches, &c. or to repair them, when beaten down.

SACKBUT, a muſical inſtrument of the wind-kind, being a ſort of trumpet, though different from the common trumpet both in form and ſize: it is fit to play a baſs, and is contrived to be drawn out or ſhortened, according to the tone required, whether grave or acute. The Italians call it trombone, and the Latins tuba ductilis.

It takes aſunder in four pieces, and has frequently a wreath in the middle, which is the ſame tube only twice twiſted, or making two circles in the middle of the inſtrument, by which means it is brought down one fourth lower than its natural tone: it has alſo two pieces or branches on the inſide, which do not appear, unleſs drawn out by an iron-bar, and which lengthens it till it hit the tone required. The ſackbut is uſually eight feet long, without reckoning the circles, and without being drawn out: when it is extended to its full length, it is uſually fifteen feet; the wreath is two feet nine inches in circumference.

There are ſackbuts of different ſizes, diſtinguiſhed by the epithets primo or I°, ſecondo or II°, terzo or III°, &c. or 1°, 2°, 3°, &c.

SACRA, the SACRED ARTERY, in anatomy, is a branch of the aorta deſcendens; which, according to Heiſter, ſometimes deſcends through the os ſacrum to the pelvis; ſometimes ariſes one from each iliac, and ſometimes is altogether wanting. See the article ARTERY.

There is alſo a vein called the vena ſacra, which ariſes from the vena cava, juſt above the iliacs: it is ſometimes double. See the article VEIN.

SACRAMENT, *ſacramentum*, ſignifies, in general, a ſign of a thing ſacred and holy; and is defined to be an outward and viſible ſign of a ſpiritual grace. Thus there are two objects in a ſacrament, the one the object of the ſenſes, and the other the object of faith. Proteſtants admit only of two ſacraments, baptiſm, and the euchariſt, or Lord's ſupper: but the roman-catholics own ſeven, *viz.* baptiſm, confirmation, the euchariſt, penance, extreme unction, ordination and marriage. See the articles BAPTISM, CONFIRMATION, &c.

The romaniſts, however, by way of eminence, call the euchariſt the holy ſacrament. Thus to expoſe the holy ſacrament, is to lay the conſecrated hoſt on the altar to be adored. The proceſſion of the holy ſacrament, is that in which this hoſt is carried about the church, or about a town.

SACRAMENT was alſo uſed in the roman law for a pledge in money which both the plaintiff and defendant in a real action laid down in court to be forfeited by him who ſhould loſe the cauſe.

SACRAMENTARIANS, a name given by the romaniſts to all ſuch as in their opinion entertain erroneous doctrines of the ſacrament of the Lord's ſupper, and chiefly uſed by way of reproach to lutherans, calviniſts, and other proteſtants.

SACRAMENTARY, an antient romiſh church-book, which contains all the prayers and ceremonies practiſed at the celebration of the ſacraments.

It was wrote by pope Gelaſius, and afterwards reviſed, corrected, and abridged by St. Gregory.

SACRED, ſomething holy, or that is ſolemnly offered and conſecrated to God, with benedictions, unctions, &c. Thus kings and prieſts are held ſacred perſons; the deaconhood, ſubdeaconhood, and prieſthood, are all ſacred orders, and impreſs a ſacred indelible character. The ſacred college is that of the cardinals.

Sacred is alſo applied to things belonging to God and the church. Thus churches, church-lands, ornaments, &c. are held ſacred. But in the civil law, a ſacred place chiefly denotes, that where a perſon deceaſed has been interred.

Sacred majeſty is applied to the emperor and the king of England; though this title has by ſome been thought blaſphemous.

SACRIFICE, a ſolemn act of religious worſhip, which conſiſted in dedicating or offering up ſomething animate or inanimate on an altar, by the hands of the prieſt, either as an expreſſion of their gratitude to the deity for ſome ſignal mercy, or to acknowledge their dependance on him, or to conciliate his favour. The origin of ſacrifices is by ſome aſcribed to the Phœnicians, but Porphyry aſcribes it to the Egyptians, who firſt offered the firſt fruits of their grounds to the gods, burning them upon an altar of turf: thus in the moſt antient ſacrifices there were neither living creatures, nor any thing coſtly or magnificent; and no myrrh or frankincenſe. At length they began to burn perfumes: and afterwards men leaving their antient diet of herbs and roots, and beginning to uſe living creatures for food, they began alſo to change their ſacrifices. The ſcriptures, however, furniſh us with a different account; for Noah, is is ſaid, ſacrificed animals at his coming out of the ark; and even Abel himſelf ſacrificed the beſt and fatteſt of his flock; but Grotius thinks it more probable that he contented himſelf with making a mere oblation of his lambs, &c. without ſlaying them.

The Jews had two ſorts of ſacrifices, taking the word in its largeſt ſignification: the firſt were offerings of tythes, firſt-fruits, cakes, wine, oil, honey, and the like; and the laſt offerings of ſlaughtered animals. When an Iſraelite offered a loaf or a cake, the prieſt broke it in two parts, and ſetting aſide that half which he reſerved for himſelf, broke the other into crumbs, poured oil, wine, incenſe, and ſalt upon it, and ſpread the whole upon the fire of the altar. If theſe offerings were accompanied with the ſacrifice of an animal, they were thrown upon the victim to be conſumed along

along with it. If the offerings were of the ears of new corn, they were parched at the fire, rubbed in the hand, and then offered to the prieſt in a veſſel, over which he poured oil, incenſe, wine and ſalt, and then burnt it upon the altar, having firſt taken as much of it, as of right belonged to himſelf.

The principal ſacrifices among the Hebrews conſiſted of bullocks, ſheep and goats; but doves and turtles were accepted from thoſe who were not able to bring the other; theſe beaſts were to be perfect and without blemiſh. The rites of ſacrificing were various, all of which are very minutely deſcribed in the books of Moſes.

The manner of ſacrificing among the Greeks and Romans was as follows: in the choice of the victim, they took care that it was without blemiſh or imperfection; its tail was not to be too ſmall at the end; the tongue not black, nor the ears cleft; and that the bull was one that had never been yoaked. The victim being pitched upon, they gilt his forehead and horns, eſpecially if a bull, heifer, or cow. The head they alſo adorned with a garland of flowers, a woollen infula or holy fillet, whence hung two rows of chaplets with twiſted ribbands; and on the middle of the body a kind of ſtole, pretty large, hung down on each ſide; the leſſer victims were only adorned with garlands and bundles of flowers, together with white tufts or wreaths.

The victims thus prepared were brought before the altar; the leſſer being driven to the place, and the greater led by an halter; when if they made any ſtruggle or refuſed to go, the reſiſtance was taken for an ill omen, and the ſacrifice frequently was ſet aſide. The victim thus brought was carefully examined, to ſee that there was no defect in it: then the prieſt, clad in his ſacerdotal habit, and accompanied with the ſacrificers and other attendants, and being waſhed and purified according to the ceremonies preſcribed, turned to the right hand and went round the altar, ſprinkling it with meal and holy-water, and alſo beſprinkling thoſe who were preſent. Then the cryer proclaimed with a loud voice, Who is here? To which the people replied, Many and good. The prieſt then having exhorted the people to join with him by ſaying, Let us pray, confeſſed his own unworthineſs, acknowledging that he had been guilty of divers ſins; for which he begged pardon of the gods, hoping that they would be pleaſed to grant his requeſts, accept the oblations offered them, and ſend them all health and happineſs; and to this general form added petitions for ſuch particular favours as were then deſired. Prayers being ended, the prieſt took a cup of wine, and having taſted it himſelf, cauſed his aſſiſtants to do the like; and then poured forth the remainder between the horns of the victim. Then the prieſt, or the cryer, or ſometimes the moſt honourable perſon in the company, killed the beaſt, by knocking it down, or cutting its throat. If the ſacrifice was in honour of the celeſtial gods, the throat was turned up towards heaven: but if they ſacrificed to the heroes or infernal gods, the victim was killed with its throat towards the ground. If by accident the beaſt eſcaped the ſtroke, leaped up after it, or expired with pain and difficulty, it was thought to be unacceptable to the gods. The beaſt being killed, the prieſt inſpected its intrails, and made predictions from them. They then poured wine, together with frankincenſe, into the fire, to increaſe the flame, and then laid the ſacrifice on the altar; which in the primitive times was burnt whole to the gods, and thence called an holocauſt: but in after times, only part of the victim was conſumed in the fire, and the remainder reſerved for the ſacrificers; the thighs and ſometimes the entrails being burnt to their honour, the company feaſted upon the reſt. While the ſacrifice was burning, the prieſt, and the perſon who gave the ſacrifice, jointly prayed, laying their hands upon the altar. Sometimes they played upon muſical inſtruments in the time of the ſacrifice, and on ſome occaſions they danced round the altar, ſinging ſacred hymns in honour of the gods.

SACRIFICE is alſo the name of an iſland in the gulph of Mexico, forty-five miles eaſt of La Vera Cruz: it is ſubject to the Spaniards.

SACRILEGE, the crime of profaning ſacred things, or thoſe devoted to the ſervice of God.

SACRISTAN, *ſacriſta*, a church officer, otherwiſe called ſexton. See SEXTON.

SACRISTY, *ſacriſtia*, in church hiſtory, an apartment in a church, where the ſacred utenſils were kept; being the ſame with our veſtry. See VESTRY.

SACRO-

SACRO-LUMBARIS, in anatomy, one of the extenſor muſcles of the back and loins, has its origin at the os ſacrum and the poſterior ſpine of the ilium, and its termination in the upper part of the ribs.

SACRUM OS, the ſacred bone, in anatomy, the lower extremity of the ſpina dorſi, being a bone of a triangular figure, with a rough ſurface; its ſubſtance is ſpongy, and it has two lateral apophyſes for its articulation with the oſſa innominata; alſo two ſmaller upper apophyſes, with glenoide cavities for the articulation into the lower vertebra; and an inferior apophyſes, for its articulation with the os coccygis: it has alſo a canal, for the end of the ſpinal marrow.

The uſes of this bone are, 1. To ſerve as a baſis to the ſpine. 2. To form the pelvis along with the oſſa innominata, and to defend the parts contained in it. 3. To contain in its ſinus the lower part of the ſpinal marrow, called cauda equina. 4. To give paſſage at its foramina, which are ſometimes four ſometimes five pair, to the nerves of the inteſtinum rectum, the bladder, and of the parts of generation, and to the large crural and iſchiatic ones. 5. To ſerve as a place of origin to many of the muſcles.

In adults, the os ſacrum is one continued bone; but, in infants, it is almoſt entirely cartilaginous; and in children more grown up, it always conſiſts of ſeveral pieces, the junctures of four or five of which may be ſeen even in adults.

SADERASAPATAN, a port-town on the coaſt of Cormandel forty miles ſouth of Fort St. George. Here the Dutch have a factory.

SADDLE, is a ſeat upon a horſe's back, contrived for the conveniency of the rider.

A hunting-ſaddle is compoſed of two bows, two bands, fore-bolſters, pannels, and ſaddle-ſtraps; and the great ſaddle has, beſides theſe parts, corks, hind-bolſters, and a trouſſequin.

The pommel is common to both.

A horſeman that would ſit a horſe well, ought always to ſit on his twiſt, and never on his buttocks, which ought never to touch the ſaddle; and whatever diſorder the horſe commits, he ought never to move above the ſaddle.

The antient Romans are ſuppoſed not to have made uſe of ſaddles and ſtirrups, and it is thought that they did not come into uſe till the time of Conſtantine the Great, A. C. 340, as appears from the greek hiſtorian, Zonaras, who (through his whole hiſtory) makes no mention of a ſaddle for a horſe, before ſuch time as Conſtans attempting to deprive his brother Conſtantine of the empire, made head againſt his army, and entering into the ſquadron where he himſelf was, caſt him beſide the ſaddle of his horſe. The ſeveral ſorts of ſaddles in uſe at preſent are. 1. The running-ſaddle; which is a ſmall one with round ſkirts. 2. The Burford-ſaddle; which hath the ſeat and the ſkirts both plain. 3. The pad-ſaddle; of which there are two ſorts, ſome made with burs before the ſeat, and others with bolſters under the thighs. 4. A french pad-ſaddle; of which the burs come wholly round the ſeat. 5. The portmanteau-ſaddle, that has a cantle behind the ſeat, to keep the portmanteau or other carriage off from the back of the rider. 6. A war-ſaddle; which has a cantle and a bolſter behind and before; alſo a fair bolſter. 7. The pack-ſaddle. As for the ſeveral parts of a ſaddle, and the deſcription of them, they are to be found under their ſeveral heads. See the articles BOW, WITHERS, STRAPS, BAND, BOLSTER, *&c.*

SADDLE-GALLED, in farriery. See the article GALLING.

SADDUCEES, in jewiſh antiquity, a famous ſect among the antient Jews, ſo called from their founder Sadoc Antigonus of Socho, preſident of the ſanhedrim at Jeruſalem, and teacher of the law in the principal divinity-ſchool of that city. Having often, in his lectures, aſſerted to his ſcholars, that they ought not to ſerve God in a ſervile manner, with reſpect to reward, but only out of filial love and fear; two of his ſcholars, Sadoc and Baithus, inferred from thence, that there were no rewards or puniſhments after this life: and, therefore, ſeparating from the ſchool of their maſter, they taught that there was no reſurrection, nor future ſtate. Many, embracing this opinion, gave riſe to the ſect of the ſadducees, who were a kind of epicureans, but differing from them in this, that though they denied a future ſtate, yet they allowed the world was created by the power of God, and governed by his providence; whereas the followers of Epicurus denied both.

The ſadducees denied all manner of predeſtination whatever, and not only rejected all unwritten traditions, but alſo all the books of the Old Teſtament, excepting

cepting the pentateuch. See the article PENTATEUCH.

SAFE CONDUCT, a ſecurity given by the king under the great ſeal to a foreigner, for his ſafe coming into and paſſing out of the kingdom.

SAFE-GUARD, a protection formerly granted to a ſtranger, who feared violence from ſome of the king's ſubjects, for ſeeking his right by courſe of law.

SAFFRON, *crocus*, in botany, *&c.* See the article CROCUS.

Saffron is cultivated in fields for uſe, and is no where raiſed with ſo much ſucceſs as in England, the engliſh ſaffron being generally allowed to be greatly ſuperior to any other. The uſual way of propagating it is by the bulbs, of which it annually produces new ones. Theſe are planted out in trenches at five inches diſtance, or leſs, and they ſeldom fail. They produce only leaves the firſt year, but in September, or October, of the year following, they flower. The ſaffron is gathered as ſoon as the flowers open, and is then ſeparated from all filth, and formed into cakes, by a very careful preſſure and gentle heat. At the end of October, when the flowering ſeaſon is over, the bulbs are taken out of the ground, and hung up in a dry place, and in ſpring are put into the ground again.

It is not, however, the entire flower of the plant that produces it, but only ſome of its internal parts. It is met with in the ſhops in flat and thin cakes, into which it has been formed by preſſing, and which conſiſt of many long and narrow filaments, that are ſmalleſt in their lower part, where they are of a pale yellow colour; in their upper part they are broader and indented at their edges, and of a very ſtrong and deep orange colour, approaching to redneſs. They are ſomewhat tough, moderately heavy, very eaſily cut, of an acrid, penetrating, but not unpleaſant ſmell, ſomewhat affecting the head, and of a bitteriſh and hot, but highly cordial taſte. Thrown into water, they almoſt inſtantaneouſly give it a ſtrong yellow or reddiſh colour, according to the quantity uſed. Theſe filaments are the criſtated capillaments, into which the piſtil of the flower divides at its head; they are of a deep reddiſh orange-colour, while growing, and there are only three of them in each flower.

Saffron is to be choſen freſh, tough, flexile, difficult to be broken, of a ſtrong ſmell, and very bitter taſte, and ſuch as ſtains the hands.

Saffron is in many places in great eſteem in ſauces, and on many occaſions in foods; but its great uſe is in medicine, and indeed with us its ſole uſe. It is a high cordial, and a very powerful aperient, detergent, and reſolvent. It is of almoſt immediate relief againſt faintings and palpitations of the heart; it alſo ſtrengthens the ſtomach, and aſſiſts digeſtion. It is of great uſe in diſorders of the breaſt ariſing from the lungs, being loaded with a tough phlegm; and it ſoftens the irritating acrimony of a vitiated ſerum on thoſe parts, and by this means is often of great uſe againſt inveterate coughs: wherefore, it is called *anima pulmonum*. It opens obſtructions in the viſcera, and particularly in the liver; it cures jaundices, and promotes the menſes. It is alſo anodyne, and occaſionally ſerves as a paregoric; it is very happily joined with opium in the laudanum of Sydenham, and in many other preparations in which that medicine has a principal ſhare.

Yet, notwithſtanding all theſe virtues, ſaffron improperly adminiſtered may do great harm: women with child, and thoſe who have profluvia of the menſes, are never to meddle with it. It has an ebriating faculty, and when taken in immoderate doſes, may bring on dreadful head-achs, long ſleep, convulſions, and even death. The very ſmell of it affects the head greatly; its effluvia affect the eyes alſo, and give them great pain; and we have an account, in Borelli, of a druggiſt's ſervant who died by the effect of a large parcel of ſaffron lying near his bed. Convulſive laughter is no uncommon effect of an immoderate doſe of ſaffron, and there are not wanting inſtances of people who have died in that ſtate: the very external uſe of ſaffron is alſo to be dreaded on ſome occaſions; the oxycroceum plaiſter, of which it is an ingredient, muſt by no means be applied in caſes where inflammation is feared; for it often occaſions one.

The common doſe of ſaffron in ſubſtance, with us, is from five grains to ten, but we are told of much greater quantities given by many people.

Saffron, diſtilled in a retort, firſt yields a ſmall quantity of a fine volatile acrid ſpirit; after this a ſubacid phlegm, then a ſmall quantity of an eſſential oil, with

a mixture of a volatile urinous ſalt; and by lixiviation of the reſiduum, a pure alkaline ſalt may be obtained.

The preparations of ſaffron, in uſe in our ſhops, are the tincture and the ſyrup. The tincture may be extracted equally well, by means of water, and of ſpirits of wine. Its doſe is from thirty drops to a drachm, or more; it is good in all caſes where the ſaffron in ſubſtance is ſo. If wine be uſed inſtead of ſpirit, it is called vinum crocatum.

Syrup of ſaffron is thus prepared: take of fine ſaffron, an ounce; cut it ſmall, and put it into a pint of mountain-wine to infuſe; let it ſtand three days without heat; then ſtraining off the wine, filter it to render it perfectly clear, and add to it twenty-five ounces of doubly refined ſugar; melt the ſugar over a gentle fire, and ſet it by for uſe.

SAFFRON, *crocus*, is alſo a name given to ſeveral chemical preparations, from their reſembling the vegetable ſaffron in colour. See the article CROCUS.

Meadow-SAFFRON, *colchicum*, in botany, *&c.* See the article COLCHICUM.

SAFFRON WALDEN. See WALDEN.

SAGAN, a town of Sileſia, ſituated on the river Bober, fifty-ſix miles north-weſt of Breſlaw.

SAGAPENUM, in pharmacy, *&c.* a gum-reſin, brought to us in two forms; the finer and purer is in looſe granules, or ſingle drops; the coarſer kind is in maſſes compoſed of theſe drops of various ſizes, cemented together by a matter of the ſame kind. In either caſe it is of a firm and compact ſubſtance, conſiderably heavy, and of a reddiſh colour on the outſide, browniſh within, and ſpotted in many places with ſmall yellowiſh or whitiſh ſpecks. Its ſmell is ſtrong and diſagreeable; its taſte acrid and unpleaſant.

It is brought to us from Perſia and the Eaſt-Indies. The plant which produces it has never been deſcribed, but is ſuppoſed to be, as Dioſcorides ſays, of the ferula-kind, from the ſeeds and fragments of the ſtalks ſometimes met with in the body of it.

Sagapenum is a very great attenuant, aperient, and diſcutient; it is good in all diſorders of the breaſt that owe their origin to a tough phlegm. It has alſo been found to diſcuſs tumours in the nervous parts, in a remarkable manner, and to give relief in habitual head-achs, where almoſt all things elſe have failed. Its doſe is from ten grains to two ſcruples, but it is now ſeldom given alone. It has been found, however, to do great things in aſthmas, in obſtructions of the viſcera, particularly the ſpleen, in nervous complaints, and even in epilepſies. It alſo promotes the menſes, and expels the ſecundines; and is an ingredient in the theriaca, mithridate, and many other of the ſhop-compoſitions.

SAGATHEE, in commerce, a ſlight kind of woollen ſtuff, ſerge, or ratteen, ſometimes mixed with a little ſilk.

SAGE, *ſalvia*, in botany, a genus of the *diandria-monogynia* claſs of plants, with a monopetalous tubular flower, labiated at the mouth: there is properly no fruit, the ſeeds, which are four in number, and roundiſh, being contained in the bottom of the cup.

The common red ſage has always been eſteemed as a cephalic and ſudorific. An infuſion of it, made in the manner of tea, has been long famous, as the common drink of people in fevers. It is attenuant and diuretic; it promotes the menſes, and is good in vertigoes, tremors, palſies, and in catarrhs. The virtues and uſes of the ſage of virtue, are the ſame with the other. Its name, indeed, has made many prefer it to the common ſage for the making tea for people in fevers; but the more agreeable flavour of the common kind, and the pleaſant colour of the infuſion, when a little lemon-juice is added, have again of late reſtored it into general uſe.

SAGENE, a ruſſian long meaſure, five hundred of which make a werſt: the ſagene is equal to ſeven engliſh feet.

SAGINA, in botany, a genus of the *tetrandria tetragynia* claſs of plants, the flower of which conſiſts of four oval, obtuſe, and patent petals, ſhorter than the cup: the fruit is an oval quadrilocular capſule, conſiſting of four valves, and containing numerous very ſmall ſeeds, affixed to the receptacle.

SAGITTA, in aſtronomy, the arrow, or dart, a conſtellation of the northern hemiſphere, near the eagle; conſiſting of five ſtars, according to Ptolemy and Tycho; but in Mr. Flamſteed's catalogue, of no leſs than twenty-three.

SAGITTA, in botany, implies the top of any ſmall twig, cyon, or graft of a tree.

SAGITTA, in trigonometry, the ſame with the verſed ſine of an arch.

SAGITTAL

SAGITTAL *future*, in anatomy, the ſecond of the genuine ſutures of the cranium or ſkull. See the article SKULL.

SAGITTARIA, or SAGITTA, WATER ARROW-HEAD, in botany, a genus of the *monoecia-polyandria* claſs of plants, the male corolla whereof conſiſts of three roundiſh, obtuſe, plane, patent petals, thrice longer than the cup: the female corolla is like that of the male one: there is no pericarpium; the receptacle, which is globoſe, collects the ſeeds into a globe: the ſeeds are numerous, compreſſed, and ſurrounded longitudinally with a broad membranaceous margin.

SAGITTARIUS, the ARCHER, in aſtronomy, the ninth ſign of the zodiac. See the article ZODIAC.

The ſtars in this conſtellation in Ptolemy's catalogue are thirty-two, in Tycho's ſixteen, and in Mr. Flamſteed's fifty-two.

SAGO, a ſimple brought from the Eaſt-Indies, of conſiderable uſe in diet as a reſtorative.

Sago is a ſort of bread produced in the following manner, from a tree called landan, growing in the Moluccos. When a tree is felled, they cleave it in two in the middle, and dig out the pith, which is eatable, when it comes freſh out of the tree. They pound it in a mortar, till it is reduced into a kind of powder ſomewhat like meal. Then they put in a ſearce made of the bark of the ſame tree, placing it over a ciſtern made of its leaves, and pour water on it, which ſeparates the pure part of the powder from the woody fibres wherewith the pith abounds. The flour thus filtrated they call ſagu, which they make into paſte, and bake it in earthen furnaces.

SAGREE, in ichthyology, a ſpecies of the ſqualus with no pinna ani, and with the noſtrils at the extremity of the roſtrum. See the article SQUALUS.

This ſpecies grows to about five feet in length, the head is large and depreſſed, the roſtrum is ſubacute, and the noſtrils are ſituated at its extremity, each having two apertures.

SAICK, or SAIQUE, a turkiſh veſſel, very common in the Levant for carrying of merchandize.

SAIL, in navigation, an aſſemblage of ſeveral breadths of canvas, ſewed together by the lifts, and edged round with a cord, faſtened to the yards of a ſhip, to make it drive before the wind. See the article SHIP.

Every yard in a ſhip has its proper ſail, except the croſs-jack, which takes its name from the yard: and thoſe which are not bent to the yard, are the flying jibb, fore, foretop, main, maintop, maintop-gallant, mizen, mizentop-maſt, ſtay-ſails, main and maintop ſtudding-ſails. See the article SHIP.

SAILS alſo denote the vanes of wind-mills. See the article WIND-MILL.

SAILS, in falconry, a term for the wings of a hawk. See the article HAWK.

SAILING, properly denotes the art of navigating and working a ſhip, or of cauſing her to obſerve ſuch motions and directions as are aſſigned by the navigator; in which ſenſe, ſailing differs from navigation, and muſt be learned by practice on ſhipboard. See NAVIGATION.

The moſt advantageous poſition of the ſails and rudder of a ſhip, has been already treated of under the article MAXIMUM.

And that their action may be reduced to the principles of the lever, has been ſhewn under the article LEVER.

The reſiſtance too which the ſhip meets with from the water, has been conſidered under the article RESISTANCE.

SAILING alſo denotes a particular method of navigation; in which ſenſe we ſay, Mercator's ſailing, plane ſailing, parallel ſailing, middle latitude ſailing, and great circle ſailing: all which, except the laſt, have been already explained under the article NAVIGATION.

Great circle-SAILING, in navigation, the art of finding what places a ſhip muſt go through, and what courſes to ſteer; ſo that her tract ſhall be in the arch of a great circle, or nearly ſo, paſſing through the place ſailed from and that bound to.

It is chiefly on account of the ſhorteſt diſtance, that this method of ſailing has been propoſed; for in the ſphere, it is well known, that the ſhorteſt diſtance between two places is the arch of a great circle intercepted between them, and not in the rhumb or ſpiral paſſing through thoſe places. See the article RHUMB.

As, in Mercator's ſailing, the ſeveral caſes were ſolved by plane triangles; ſo the ſolution of the caſes of great circle-ſailing is obtained by means of ſpherical triangles: and, therefore, the navigator ſhould be maſter of ſpherical trigonometry, before he attempts this method. See the article TRIGONOMETRY.

A great variety of caſes might be propoſed in this kind of ſailing; but as

many of them may ſerve rather for exercifes in the ſolution of ſpherical triangles, than for any real uſe towards the navigating of a ſhip, we ſhall only conſider thoſe appertaining to the following problem, *viz.*

Prob. I. The latitudes and longitudes of two places on the earth being given, required their neareſt diſtance on the ſurface, together with the angles of poſition from either place to the other. This problem may be branched out into the ſix following caſes.

Caſe I. When the two places lie under the ſame meridian, their difference of latitude will give their diſtance, and the poſition of one from the other will be directly north or ſouth.

Caſe II. When the two places lie under the equator, their diſtance is equal to their difference of longitude; and the angle of poſition, with reſpect to the meridian of either, is a right angle, or the courſe from one to the other is due eaſt or weſt.

Caſe III. When both places are in the ſame parallel of latitude.

Example. What is the ſhorteſt diſtance between St. Mary's, in N. lat. 37°, and W. long. 22° 56′; and Cape Henry, in N. lat. 37°, and W. long. 76° 23′?

Let PESQ (plate CCXXXVI. fig. 1. n° 1.) repreſent the meridian of St. Mary's, AB *a* the parallel of 37° N. lat. and PBCS the meridian of Cape Henry; then will the point A be St. Mary's, and the point B Cape Henry: draw the diameter AD, and through the points A, B, D, deſcribe the great circle ABD; then is the arch AB the ſhorteſt diſtance, the angle PAB the angle of poſition from A to B; and the angle PBA the angle of poſition from B to A; and the angle APB, which is meaſured by the arch QC, is the difference of longitude. Now as the places have both the ſame latitude, therefore PA = PB, and ∠ PAB = ∠ PBA; and if PI be deſcribed making ∠ API = ∠ BPI = 26° 43′½, then will PI biſect AB, and be perpendicular to it in I. And in the triangle AIP, right-angled at I, there will be given the hypothenuſe AP = 53°, and the angle API = 26° 43′½; whence to find the leg AI =, half the diſtance ſought, we have this analogy, *viz.* radius = 90°: ſine of hypothenuſe PA = 53°:: ſine of ∠ API = 26° 43′½: ſine of the leg AI = 21° 3′; which doubled gives 42° 6′ for the ſhorteſt diſtance AB = 2526 nautical miles, which is 35 miles leſs than 2561, the nautical miles found by parallel ſailing.

To find the angle of poſition PAB, we have this analogy, *viz.* Radius = 90°: co-ſine of hypothenuſe, PA = 53°:: tangent of ∠ API = 26° 43′½: co-tangent of ∠ PAB, or angle of poſition = 73° 9′. Hence it appears, that to ſail from A to B, or from B to A, the ſhip muſt firſt ſteer, N, 73° 9′ weſt or eaſt; and then gradually increaſe her courſe till I, where it will be due weſt or eaſt; and from thence the courſe is to be gradually diminiſhed again till ſhe comes to the other port, where it will be 73° 9′, the ſame as ſhe ſets out with but how theſe courſes are to be altered will be ſhewn hereafter.

Caſe IV. When one place has latitude, and the other has none, or is under the equator.

Example. What is the neareſt diſtance between the iſland of St. Thomas, under the equator, and eaſt long. 1°, and port St. Julian in ſouth lat. 48° 51′, and weſt long. 65° 10′?

Let the point A (*ibid.* n° 2.) repreſent St. Thomas, and the point B port St. Julian; then is AB, an arch of a great circle paſſing through A and B, the neareſt diſtance; which may be found by this analogy, *viz.* Radius = 90°: co-ſine of difference of long. = AC = 66° 10′:: co-ſine of difference of latitude CB = 48° 51′: co-ſine of the diſtance AB = 74° 35′. So that the diſtance AB = 74° 35′ = 4475 miles; which is leſs, by fifty-ſeven miles, than the diſtance found by Mercator's ſailing.

For finding the angle of poſition at A, the proportion is R = 90°: ſine AC = 66° 10′:: co-tangent CB = 48° 51′: co-tangent of ∠ SAB = 51° 22′. And the angle of poſition at B may be found by this analogy, *viz.* R = 90°: ſine CB = 48° 51′:: co-tangent AC = 66° 10′: co-tangent ∠ B = 71° 36′.

Caſe V. When the latitudes of the given places are either both north or both ſouth.

Example. What is the neareſt diſtance between the Lizard in north lat. 49° 57′, and weſt long. 5° 14′. and the iſland of Bermudas, in north lat. 32° 25′, and weſt longitude 66° 38′?

Let SAPQ (*ibid.* n° 3.) repreſent the meridian of Bermudas; make PA = 57° 35′ = the co-latitude of Bermudas; and P*a* = 40° 3′ = co-latitude of the Lizard; and, with the tangent of P*a*, deſcribe the arch *a a*: alſo, with the ſe-

cant

Fig. 1. Great Circle-SAILING.

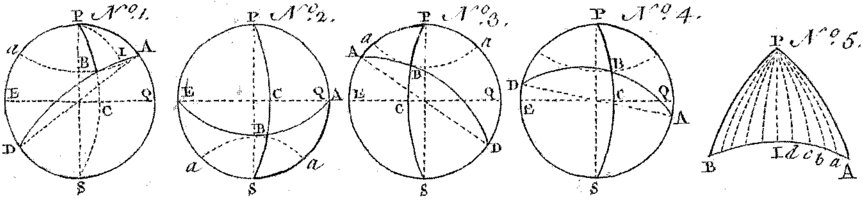


Fig. 2. SALIANT.

Fig. 3. SALTIER.

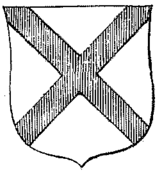


Fig. 4. SANICLE

Fig. 5. SATURN

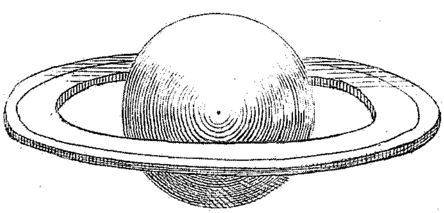


Fig. 6. SAXIFRAGE.

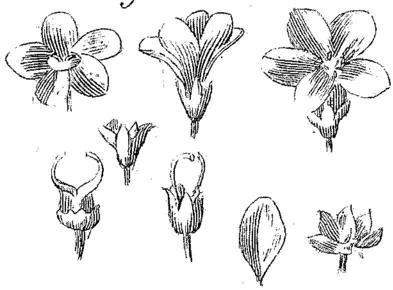


Fig. 7. The SAW uſed in Amputations.

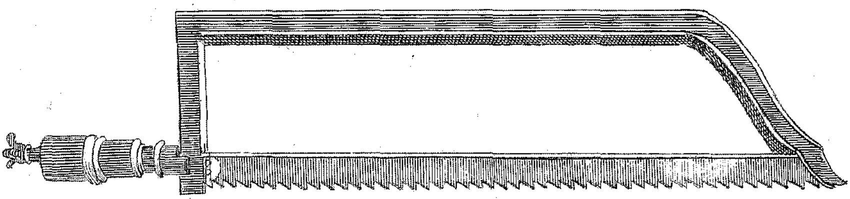
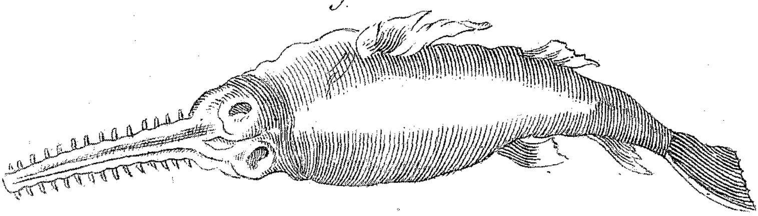


Fig. 8. The SAW-FISH.



T. Jefferys sculp.

cant of 61° 24′ = difference of long. arcs described from P and S, give the center of the circle, PCS, the meridian of the Lizard; and its intersection with *aa* gives B the place of the Lizard. Lastly, a great circle being described through the points ABD, the intercepted arch AB is the nearest distance between the two places; and the angles PAB, PBA, are the angles of position.

In the oblique spheric triangle APB, are given PA = 57° 35′, PB = PA = 40° 3′, and ∠APB = difference of long. = 61° 24′. Hence, to find the distance AB, we have this analogy, *viz.* rad.: co-sine ∠APB:: tang. AP: tang. of a fourth arc = 37° 1′ = M; which taken from the co-latitude of the Lizard, leaves a fifth arc = 3° 7′ = N. Then, co-sine M: co-sine N:: co-sine PA: cosine of the distance AB = 47° 54′.

To find the angle of position PBA, the proportion is, sine of N: sine of M:: tangent ∠APB: tangent ∠PBA = 87° 15′. And the angle of position, PAB, may be found by the proportion between opposite sides and angles, *viz.* sine of PA: sine of ∠PBA:: sine of PB: sine of ∠PAB = 49° 35′.

Hence it appears that the shortest distance between the Lizard and Bermudas, is 47° 54′ = 2874 nautical miles; which is 178 miles less than the distance found by Mercator's sailing. And a ship, in order to run this shortest tract, must sail from the Lizard S. 87° 15′ W. and gradually lessen the course, so as to arrive at Bermudas on the rhumb bearing S. 49° 35′ W. whereas the direct course from one place to the other, as found by Mercator's sailing, is S. 69° 2′ W.

Case VI. When one of the given places has north latitude, and the other south latitude.

Example. What is the nearest distance from the island of St. Helena to the island of Bermudas; the former lying in S. lat. 16°, and W. long. 6° 15′; and the latter in N. lat. 32° 25′, and W. long. 66° 38′?

Let SEPQA (*ibid.* n° 4.) be the meridian of St. Helena, the point A St. Helena, and the point B Bermudas; then we have given PA = 106° = lat. of St. Helena + 90°, PB = co-latitude of Bermudas = 57° 35′, and ∠APB = difference of longitude = 60° 23′. Therefore, in the oblique spheric triangle ABP, we have the following proportions for finding the distance AB, *viz.* rad.: co-sine difference of long. = ∠APB:: tangent co-latitude of Bermudas = PB: tangent of a fourth arc M = 37° 54′; which taken from 106° leaves a fifth arc N = 68° 6′. And co-sine of M: co-sine of N:: co-sine of PB: co-sine of the distance AB = 75° 19′.

Next to find the angle of position PAB, the fourth and fifth arcs being found before, we have this proportion, *viz.* sine of N: sine of M:: tangent APB: tangent of PAB = 49° 20′. And to find the angle of position PBA, the proportion is as rad.: co-sine ∠P:: tangent PA: tangent of a fourth arc M = 59° 53′: But this fourth arc must be like PA, or obtuse; and therefore the supplement of 59° 53′, or 120° 7′, is the fourth arch M. Then, as sine of N: sine of M.: tangent ∠P: tangent of ∠PBA = 59° 45′: but this angle ought to be obtuse, and therefore we must take the supplement to it, *viz.* 120° 15′.

So that was a ship to sail from St. Helena to Bermudas, on the arc of a great circle, she must first shape her course N. 49° 20′ W. and gradually deflect from the north, so as to arrive at Bermudas on a course N. 59° 45′ W. after having run 75° 19′, or 4519 nautical miles. The course found by Mercator's sailing is N. 50° 5′ W. and the distance is 4527 sea-miles; whereby it appears, that when the places are one in N. latitude, and the other in S. latitude, there is but a small difference between the results found by Mercator's and great circle sailing, because the rhumb-lines near the equator do not greatly differ from great circles.

From the solutions of the foregoing cases it is plain, that to sail in a great circle the ship must continually alter her course: but as this is a difficulty too great to be admitted into the practice of navigation, therefore it has been thought sufficiently exact to effect this business by a kind of approximation; that is, by a method which nearly approaches the sailing on a great circle: for in small arcs the difference between the arc and its chord, or tangent, is so small that they may be taken one for the other in any nautical operations. Upon this principle the great circles on the earth are supposed to be made up of short lines, each of which is a segment of a rhumb-line; and on this supposition the solution of the following problem is deduced,

Prob. II.

Prob. II. Having given the latitudes and longitudes of the places ſailed from and bound to; to find the ſucceſſive latitudes in the arc of a great circle, in thoſe places, where alterations in longitude ſhall be a given quantity; together with the courſes and diſtances between thoſe places.

Solution. 1. Find the angle of poſition at each place, and their neareſt diſtance, by one of the caſes of prob. I. 2. Find the greateſt latitude the great circle runs through; that is, find the perpendicular from the pole to that circle; and alſo find the ſeveral angles at the pole, made by the given alterations of longitude between this perpendicular and the ſucceſſive meridians come to. 3. With this perpendicular and the polar angles, ſeverally, find as many correſponding latitudes, by ſaying, as radius : tangent of greateſt latitude

:: co-ſine of 1ſt. polar ∠ : tang. 1ſt. lat.

:: co-ſine of 2d. polar ∠ : tang. 2d. lat.

&c. &c.

4. Having thus found the ſeveral latitudes paſſed through, and the difference of longitude between each, find by Mercator's ſailing the courſes and diſtances between thoſe latitudes: and theſe are the ſeveral courſes and diſtances the ſhip muſt run to keep nearly on the arc of a great circle.

Now the ſmaller the alterations in longitude are taken, the nearer will this method approach the truth: but the uſual way is to compute to every five degrees of difference of longitude, the length of the arc of five degrees, differing from its chord, or tangent, only by 0,0002.

If the reſults of the ſeveral operations, for inſtance of the example of caſe III. prob. I. wrought by this method, be entered in ſuch a table as the following, it will be found of convenience to the operator.

Polar angles (*ibid.* n° 5.)	Succeſs longs.	Succeſs lats.	Diff. long.	Diff. lat.	Merid. parts.	Merid. diff. lat.	Courſes.	Diſtances.
∠ IP B = 26° 43′ ½	22° 56′	37° 00′			2392.6			
∠ IP *a* = 21° 43′ ½	27° 56′	38° 05′	300	65	2474.6	82.0	74° 43′	246.6
∠ IP *b* = 16° 43′ ½	32° 56′	38° 56′	300	51	2539.8	65.2	77° 44′	240.0
∠ IP *c* = 11° 43′ ½	37° 56′	39° 33′	300	37	2587.6	47.8	80° 57′	235.2
∠ IP *d* = 6° 43′ ½	42° 56′	39° 57′	300	24	2618.8	31.2	84° 04′	232.2
	49° 39′ ½	40° 09′	403.5	12	2634.5	15.7	87° 46′	307.9
								1261.9

Hence it appears that the ſhip muſt firſt ſail N. 74° 43′ W. the diſtance of 246.6 nautical miles; againſt which time ſhe will have changed her latitude and longitude, &c. as expreſſed in the reſpective columns ſtanding in a line with the above courſe and diſtance. Her ſecond courſe will be N. 77° 44′ W. the diſtance 240 nautical miles; and the other particulars as expreſſed in the ſame line under their ſeveral columns. Now the column of diſtances, being ſummed up, amounts to 1261.9; which being doubled, gives 2523.8 nautical miles for the diſtance between St. Mary's and Cape Henry; differing only from 2526, the diſtance found by prob. I. caſe III. by 2. 2. miles.

The tract of a ſhip, when thus directed nearly in the arc of a great circle, may be delineated on the Mercator's chart, by marking thereon, by the help of latitudes and longitudes, the ſucceſſive places where the ſhip is to alter her courſe: then thoſe places, or points, being joined by right lines, will ſhew the path along which the ſhip is to ſail, under the propoſed circumſtances.

SAILORS, the elder ſeamen, who are employed in working or managing the ſails, the tackle, ſteering, &c. See NAVAL *affairs*, SEAMEN, &c.

SAINT, in the romiſh church, a holy perſon deceaſed, and ſince his deceaſe canonized by the pope, after ſeveral informations and ceremonies. See the articles CANONIZATION, BEATIFICATION, &c.

One of the points wherein the roman catholics and proteſtants differ is, that the former addreſs, invoke, and ſupplicate ſaints, &c. to intercede for them; whereas the latter hold it ſufficient to propoſe their good examples for our imitation. The number of ſaints, allowed a ſuch in the romiſh church, is prodigious

Fathe

Father Papebroche reckons ſeventeen or eighteen to have died on the firſt of June only. Father Mabillon, in an expreſs diſſertation on the worſhip of unknown ſaints, obſerves, that honours are given to ſaints who perhaps were not chriſtians, and whoſe very names were never known: hence being under a neceſſity of giving them names, they are therefore called baptized ſaints. He adds, that they every day beſeech ſaints to intercede for them with God, when it is a matter of doubt whether they themſelves be in heaven.

SAINT-FOIN, *anabrychis*, in botany, a ſpecies of the hedyſarum. See the article HEDYSARUM.

For the uſe of this plant in feeding cattle, ſee HAY and GRASS.

SAINTES, a city of France, in the province of Guienne, capital of the territory of Saintogne, ſituated on the river Charente, in weſt long. 36′, north lat. 45° 50′.

SAKER, a ſmall ſort of cannon, whereof there are three ſpecies, extraordinary, ordinary, and middle ſized. See the article CANNON.

SAL, in chemiſtry, *&c.* See SALT.

For the preparations and uſes of ſal-armoniacum, ſal-anatron, ſal-Glauberi, ſal-prunellæ, ſal-tartari, ſal-polycreſtum, ſal-gemmæ, ſal-volatile, *&c.* See the articles ARMONIACUM, ANATRON, GLAUBER, PRUNELLA, *&c.*

SAL, one of the iſlands of cape Verd, ſituated in the Atlantic-ocean: weſt long. 23°, lat. 17°.

SALA, a river of Germany, which riſing in Franconia and running north, enters Saxony and falls into the Elbe below Deſſau.

SALA, a town of Sweden, in the province of Weſtmania, ſituated thirty miles weſt of Upſal.

SALACIA, in zoology, a genus of the gymnarthria, or thoſe inſects which have ſoft and naked bodies furniſhed with limbs.

The body of the ſalacia is of an ovato-oblong form, and the tentacula are numerous and diſpoſed in little cluſters. There are two ſpecies of the ſalacia, the one with an undulated ſurface, about an inch and three quarters in length, and its thickneſs about an inch: it is largeſt at the naked extremity, where it terminates in a rounded but not very thick end. The other is the ſmooth and oblong ſalacia, of about two inches and a half long, and an inch aud a half in diameter.

SALAMANCA, a city of Spain, in the province of Leon, ſituated on the river Tormes: weſt long. 6° 10′, north lat. 41°.

SALAMANCA is alſo a city of Mexico, in north-America, in the province of Jucatan, ſituated near the gulph of Honduras: weſt long. 93°, north lat. 17° 15′.

SALAMANDER, *ſalamandra*, in zoology, a name given by authors to ſeveral ſpecies of the lizard kind; but the principal are two, the ſalamandra aquatica, the water-newt, and the ſalamandra terreſtris. See the articles LACERTA and NEWT.

The ſalamandra aquatica is the two-edged-tailed lizard, with four toes on the anterior, and five on the hinder, feet. It grows to about four inches in length, and to the thickneſs of a man's finger: the back is of a deep ſhining brown; the belly of a bright and gloſſy yellow.

The ſalamandra terreſtris, or land ſalamander, is a ſpecies of lizard, the tail of which is ſhort, and its colour of a fine black, marked with red ſpots of a bright and ſhining gloſſy appearance.

SALAMANDER'S-BLOOD, among chemiſts, denotes the redneſs remaining in the receiver after diſtilling the ſpirit of nitre. See the article NITRE.

SALAMIS, an iſland in the gulph of Engia, in european-Turky, ſituated in eaſt long, 34°, lat. 37° 32′, being about fifty miles in circumference.

SALANKAMEN, a town of Sclavonia, ſituated on the Danube, twenty miles north-weſt of Belgrade.

SALARY, *ſalarium*, a recompence made to a perſon for his pains or induſtry about another perſon's buſineſs, as in the caſe of officers, *&c.* And it is generally taken for any wages, ſtipend, or allowance.

SALE, in general, ſignifies the transferring the property of goods from one to another, upon ſome valuable conſideration, as where in a bargain one agrees to give another a certain ſum of money for ſuch goods, and thereupon gives the ſeller earneſt, which he accepts; this is a perfect ſale, and ſhall bind the buyer and ſeller.

A perſon may at any time ſell his goods or chattels, even though he fears and knows of an execution againſt him for debt, unleſs there be a private truſt between the parties, and the writ of execution

cution is delivered to the ſheriff, *&c.* And it is held that upon the ſale of a horſe, or other beaſt, it may not only be detained till the ſame is paid for, but if ſuch horſe, *&c.* happens to die, after being ſold, and before delivery, the ſeller may have an action for the money agreed, the property being in the buyer. See BARGAIN, EARNEST, *&c.*

Where a perſon affirms a particular thing ſold to be of a certain value, and at the ſame time it is not, for this no action lies; but if he actually warrants the ſame, and this be not the caſe after ſale, it will bear an action, as being part of the agreement. As to the ſale of goods in fairs and markets, ſee the articles FAIR and MARKET.

SALEM, a port town of New-England, a little north of Boſton.

SALEP, in the materia medica, the root of a ſpecies of orchis. See ORCHIS.

Salep ſhould be choſen clean, firm and hard: it is very little liable either to decay or ſophiſtication. The people of the eaſt-Indies look upon ſalep to be one of the greateſt reſtoratives and provocatives to venery in the whole vegetable world. The ſalep differs very little from the common orchis in virtue. Its appearance is owing to the manner of preparing it, and conſequently this may be done from the roots of orchis of our own growth. To prepare theſe in imitation of ſalep. Mr. Geoffroy choſe the largeſt, faireſt, and plumpeſt roots he could find: theſe he nicely ſkinned; then throwing them into cold water he ſuffered them to macerate there for ſome time: after this he lightly boiled them, and then taking them out of the water and draining them, he had them ſtrung upon threads to be dried in a warm dry air: when the roots were thoroughly dried they were very tranſparent, and reſembled pieces of tragacanth, and continued dry and hard. The roots thus prepared may be reduced to powder, which will diſſolve away in boiling water, and a ſcruple of it will make a baſon full of jelly, in the manner of the turkiſh ſalep. This jelly is an admirable medicine in all caſes in which ſalep is preſcribed; and the powder may be given with great ſucceſs in aſſes-milk for diſeaſes of the breaſt. The ſalep which we receive from Turky is always a tranſparent root, of a whitiſh or reddiſh colour, according to its different age, and is chiefly recommended in conſumptions, bilious dyſenteries and diſorders of the breaſt proceeding from an acrimony of the juices.

SALERNO, a city and port town of Italy, in the kingdom of Naples, and the hither principat, ſituated on a bay of the tuſcan-Sea: eaſt long. 15^{g} 20′, north lat. 40^{g} 40′.

SALET, SALLET, or SALADE, in war, a light covering or armour for the head, antiently worn by the light horſe, only differing from the caſk in that it had no creſt, and was little more than a bare cup.

SALIANT, in fortification, denotes projecting. There are two kinds of angles, the one ſaliant, which are thoſe that preſent their point outwards; the other re-entering, which have their points inwards. Inſtances of both kinds we have in tenailles and ſtar-works. See the article ANGLE, *&c.*

SALIENT, SALIANT, or SAILLANT, in heraldry, is applied to a lion, or other beaſt, when its fore-legs are raiſed in a leaping poſture. See plate CCXXXVI. fig. 2.

A lion ſalient is that which is erected bendways, ſtanding ſo as that his right fore-foot is the dexter chief point, and his hinder left foot is the ſiniſter baſe point of the eſcutcheon, by which it is diſtinguiſhed from rampant. See the article RAMPANT.

SALIC, or SALIQUE LAW, *lex ſalica*, an antient and fundamental law of the kingdom of France, uſually ſuppoſed to have been made by Pharamond, or at leaſt by Clovis, in vertue whereof males are only to inherit. Du Haillan, after a critical examination, declares it to have been an expedient of Philip the long, in 1316, for the excluſion of the daughter of Lewis Hutin from inheriting the crown. Father Daniel, on the other hand, maintains that it is quoted by authors more antient than Philip the long, and that Clovis is the real author of it. This law has not any particular regard to the crown of France; it only imports, in general, that in ſalic land no part of the inheritance ſhall fall to any female, but the whole to the male ſex. By ſalic lands, or inheritances, were antiently denoted, among us, all lands, by whatever tenure held, whether noble or baſe, from the ſucceſſion whereto women were excluded by the ſalic law; for they were by it admitted to inherit nothing but moveables and purchaſes wherever there were any males.

SALICARIA, in botany, Tournefort's name for the lythrum. See the article LYTHRUM.

SALICORNIA, in botany, a genus of the *monandria-monogynia* claſs of plants, having no corolla: there is no pericarpium, but the calyx becomes more ventricoſe and contains a ſingle ſeed.

A decoction of the leaves of this plant is very opening, provokes urine and the menſes, accelerates the birth and ſecundines, purges watry humours, whence it is of ſervice in a dropſy. Its aſhes are uſed in making ſoap and glaſs: and being infuſed in water, cure the itch and all cutaneous diſeaſes, the part affected being waſhed therewith.

SALII, in roman antiquity, prieſts of Mars, whereof there were twelve, inſtituted by Numa, wearing painted particoloured garments and high bonnets, with a ſteel-cuiraſſe on the breaſt. They were called ſalii from *ſaltare*, to dance; becauſe, after aſſiſting at ſacrifices, they went dancing about the ſtreets, with bucklers in the left hand, and a rod in the right, ſtriking muſically on one another's bucklers with their rods, and ſinging hymns in honour of the gods. In ſinging they had a peculiar antient ſong, called Saliare carmen; and after the ceremony they were entertained with a feaſt. There were two companies or colleges of the ſalii; the antient one eſtabliſhed by Numa, called palatini; the latter by Tullus Hoſtilius, called collini and quirinales. Sextus Pompeius makes mention of ſalian maids, *virgines ſaliares*, hired on purpoſe, and joined with the ſalii, wearing a kind of military garb, with high round bonnets, like the ſalii.

SALINA, antiently Salamis, a port-town of the iſland of Cyprus, ſituated on the ſouth ſide of the iſland, in eaſt long. 34° 30′, and north lat. 34° 30′.

SALINS, a city of France, in the province of Franche Comte, ſituated in eaſt long. 5° 50′. and north lat. 47°.

SALISBURY, the capital city of Wiltſhire, ſituated eighty miles weſt of London, and thirty-five miles ſouth eaſt of Briſtol.

It ſends two members to parliament.

SALIVA, SPITTLE, a thin pellucid humour, ſeparated from the arterial blood, by the glands about the mouth and fauces, and conveyed, by proper ſalival ducts, into the mouth, for ſeveral uſes.

It conſiſts of a great deal of water or phlegm, and a volatile ſalt, and ſome add a ſulphureous ſpirit; and is void both of taſte and ſmell. Its uſes are very great; it moiſtens the throat, preſerves it from the injuries of the air, and facilitates ſpeech. Being mixed with aliment, it renders ſwallowing eaſy, and aſſiſts digeſtion by its aqueous, ſaline, and oily parts. Some imagine it to do the office of a menſtruum, by mixing the oily and aqueous parts of the food more intimately, diſſolving the ſaline parts, and procuring a fermentation in the ſtomach: but Dr. Drake is of opinion, that were the ſaliva acrimonious enough for this purpoſe, it muſt greatly offend the ſtomach, eſpecially conſidering the quantities of it that many ſwallow, even upon an empty ſtomach. In hungry perſons, ſays Boerhaave, it is fluid, acrid, and copiouſly diſcharged; and in thoſe who have faſted long, it is highly acrid, penetrating, and reſolvent. In farinaceous and ſucculent vegetables, it not only produces a fermentation, but alſo augments one already begun. It is ſwallowed not only by brutes, but by human creatures, in a ſound ſtate, even when aſleep. Too copious an evacuation of it, made voluntarily, produces loſs of appetite, bad digeſtion, and an atrophy. By manducation therefore the ſaliva is expreſſed and accurately mixed with the attenuated food; which contributes, firſt, to the aſſimilation of the aliments to the nature of the body to be nouriſhed: ſecondly, to the due mixture of the oleous to the aqueous parts: thirdly, to the ſolution of the ſaline parts: fourthly, to fermentation: fifthly, to a change of the taſte and ſmell of the aliments: ſixthly, to an augmentation of the inteſtine motion: ſeventhly, to a momentaneous relief from hunger; and, eighthly, an application of the ſapid parts, though inſipid itſelf. See CHYLIFICATION, MANDUCATION, DIGESTION, *&c.*

SALIVAL, an epithet applied to the glands and ducts which ſupply and ſecrete the ſaliva. See the articles GLAND, DUCT, and the preceding article.

Anatomiſts commonly reckon three pair of ſalival glands, *viz.* two parotides, two maxillares, and two ſublinguales. See the articles PAROTID, *&c.*

Theſe indeed are the largeſt, and furniſh the greateſt quantities of ſaliva; but there are a great number of other leſſer glands of the ſame kind, which may be reckoned aſſiſtants, or ſubſtitutes to the former; all theſe may be determined ſalival glands, and they may be enumer-

ated in the following manner: the parotid glands, the maxillary glands, the ſublingual glands, the glandulæ molares, buccales, labiales, the linguales, the amygdalæ, the palatinæ, the uvulares, the arytenoidææ, and the glandula thyroidæa. See MOLARES, BUCCALES, *&c.*

With regard to the ſalival ducts, the moſt noted of them is that of the parotides, produced by the union of a great number of ſmall tubes, repreſenting ſo many roots; it is called the ductus ſtenonis, or ductus ſuperior; it runs obliquely forwards, on the outſide of the maſſeter, and then perforates the buccinator from without inward, oppoſite the interſtice between the ſecond and third dentes molares, where the hole or orifice repreſents the ſpout of an ewer. The duct of the maxillary glands, called alſo the lower or inferior duct, and the ductus ſalivalis Whartoni, advances on the ſide of the muſculus genioglooſſus along the inner part and ſuperior edge of the glandula ſublingualis to the frenum of tongue, where it terminates by a ſmall orifice, in form of a papilla. The glandulæ ſublinguales ſend out laterally ſeveral ducts, which open near the gums, by the ſame number of orifices, all ranked in the ſame line, but a ſmall diſtance from the frenum, and a little more backward.

Extirpation of the SALIVAL *glands*, a method which Heiſter tells us he often has had recourſe to, when theſe glands have been violently ſwelled and ſeverely indurated, even approaching to a carcinomatous nature, after they had been treated by other phyſicians with corroſives, digeſtives and other medicines. In this operation the ſurgeon muſt open the ſkin above the tumor, with a longitudinal inciſion, and carefully ſeparate the ſchirrhous glands from the contagious part with a knife, and at laſt from the arteries with which it is connected; then immediately, whilſt the blood ruſhes out in great abundance, the operator muſt dip a ball of linnen-rags in a ſtyptic liquor, and preſs it upon the larger wounded arteries; the remainder of the cavity of the wound muſt be filled with ſcraped lint and dry rags, and compreſſed with the finger, and then a larger piece of puff-ball, with three or four thick compreſſes muſt be applied, ſecuring the whole with a proper bandage. After the third or fourth day, the bandage and compreſs may be removed, and ſo much of the puff-ball as is looſe, leaving every thing that has a ſtrong adheſion; then new compreſſes, dipped in warm ſpirit of wine, or digeſtive fomentations may be directly applied, and ſecured with the bandage, as before, but a little more relaxed: the ſecond and third dreſſings muſt be performed every other day, and the reſt muſt be renewed every day. In all the dreſſings it muſt be obſerved, that none of the compreſſes, puff-ball, or lint be removed, but what are quite looſe: the wound may be cleanſed by ſome digeſtive ointment, and incarnated by a vulnerary balſam. See the article WOUND.

SALIVATION, in medicine, a promoting of the flux of ſaliva, by means of medicines, moſtly by mercury. The chief uſe of ſalivation is in diſeaſes belonging to the glands, and the membrana adipoſa, and principally in the cure of the venereal diſeaſe, though it is ſometimes alſo uſed in epidemic diſeaſes, cutaneous diſeaſes, *&c.* whoſe criſes tend that way. See the articles POX, *&c.*

A ſalivation is excited, according to Boerhaave, 1. By waſhing the mouth with certain liquors. 2. By the ſlow and protracted maſtication of ſome viſcid matter, ſuch as maſtich, wax, and myrrh, eſpecially if acrid ſubſtances are mixed with theſe, ſuch as pellitory of Spain, pyrethrum, ginger, and pepper. 3. By drawing into the mouth acrid and irritating vapours, ſuch as thoſe of tobacco, ſage, roſemary, marjoram, thyme, and mother of thyme. 4. A ſalivation is excellently excited by the action of ſuch medicines as produce a gentle but long continued nauſea, ſuch as antimony neither entirely fixed nor totally emetic, taken with a ſmall quantity of common vitriol. 5. By ſuch ſubſtances as totally diſſolve all the parts of the blood, convert it into lymph, and render it fit for a diſcharge by way of ſaliva; ſuch as crude quickſilver, cinnabar, a ſolution of quickſilver in aqua fortis, white precipitate, red precipitate, turbith mineral, and ſublimate mercury diſſolved: the action of thoſe medicines is promoted by warm fomentations applied to the head, neck, and face. An exceſſive ſalivation is leſſened or ſtopped, 1. By a large and continual uſe of mild and tepid drinks, ſuch as decoctions of mallows and liquorice in milk and water. 2. By allaying the impetus of the humours, by means of mild, oleous, and anodyne emulſions, with a proper addition

tion of diacodium or opium. And, 3. By making a revulſion of the humours to other parts, eſpecially that by ſtool. But great caution is neceſſary, leſt the impetus of the moved matter, which in this caſe is always acrid, ſhould ruſh to other parts, and produce a greater danger.

The regular, ſafeſt, and moſt commodious method of ſalivation is by mercurius dulcis ſix times ſublimed, given inwardly in the milder pox, &c. or by mercurial unction, when the diſeaſe is got into the bones. According to Turner, fifteen grains of mercurius dulcis may be given in a morning, and a like doſe at night, with electuary of ſcordium. After three, four, or five days, with this management, the fauces are obſerved to inflame, the inſide of the cheeks to tumify, the tongue to look white and foul, the gums to ſtand out, the breath to ſtink, and the whole inſide of the mouth to appear ſhining and lie in furrows as if parboiled. The patient now refuſes nouriſhment, while all parts of his chaps are ſo ſwelled and ſore that he cannot chew any ſolid food, but is forced to take liquids and the ſofter aliments. They are now frequently ſick, and throw up a thin phlegm. The inſide of the mouth thus beginning to be whealed, will ſoon be ulcerated, eſpecially about the ſalival glands, which empty themſelves thereinto. Now it may be proper to deſiſt a day or two, to obſerve the increaſe of the ulcers, what ſloughs are like to be raiſed, and what their depth and dimenſions are like to prove, from which a near conjecture may be made of the duration as well as quantity of the ſpitting now begun, and the conſiſtence of the drilling lympha. The ſalivation thus begun, the patient is to be ſometimes refreſhed by a little mulled wine. Let his diet be ſmall chicken-broth, water-gruel, and panada; his drink ſmall ſack-whey, or poſſet-drink, and a draught of good ſmall beer, with a toaſt, between whiles; and in caſe of gripes or a looſeneſs, the white decoction.

Thus, after ſome days reſpite, if the patient is hearty, his chaps but little ſwelled on the outſide, and as little ſore within, the ulcers not increaſing, and the flux inconſiderable, you may give one ſcruple of mercurius dulcis in electuary of ſcordium at going to reſt, repeating it two or three days following, as you find occaſion; or you may vomit him with eight or ten grains of turpeth mineral, in conſerve of roſes: but if the ſalivation cannot be raiſed to any quantity, you muſt forbear, and purge it off, and give calomel once or twice a week, and purge it off the next day, or two days after. When the ſpitting goes well forward, it may be left to take its courſe, till it declines of itſelf, which, in proportion to the ulcers and thickneſs of the ſloughs about the mouth, may happen at the end of twenty-one days, or a month from its firſt riſing; that is, from the time of ſpitting a pint and a half a day, till it come to three pints or even five pints in twenty-four hours, then it gradually goes off again.

In the more ſtubborn and rebellious pox, &c. attended with grievous ſymptoms, ſuch as rotten bones, &c. and the patient has been uſed to mercurials, or ſalivated before, then the cure muſt be attempted with ſalivation by unction. To this end mix an ounce of quickſilver with three ounces of axunguia, of which an eighth part is to be uſed night and morning, letting the patient rub it with his own hands gently by the fire, beginning with his ancles, up to his ſhins and knees, all round his joints, and ſo to his thighs, which are preſently after to be covered with yarn-ſtockings and flannel-drawers; then let him uſe the remainder of his eighth part about his elbows and ſhoulders, wiping his hands clean about the glands of his arm-pits, or thoſe of his groin: his body, during the unction, ſhould be ſcreened from the cold with a blanket hung behind him, and then be wrapped up in warm flannel, that is, a flannel-ſhirt, waiſtcoat, drawers, cap, and muffler. And the ſame is requiſite in the former way, to defend the patient from the cold air. The weak need only to anoint once a day; but thoſe that are ſtrong, may take a fourth part of the ointment, and rub it in at once every night; after which let him get between flannel-ſheets or blankets, diſpoſing him to a gentle breathing ſweat with a draught of warm poſſet, mace-ale, or if very feeble, with a cup of mulled wine. If, when the ointment is divided into four parts, after the third unction, the patient begins to complain of his chaps, you may ſtay a day or two before you proceed farther; the ſame when gripes or bloody ſtools approach. On the other hand, if an ounce or an ounce and an half of quickſilver will not do, give the turpeth, as before directed. and if the ſpitting declines too ſuddenly, give a

ſcruple of calomel every day, for two or three times, as you ſee occaſion. When the ſalivation is going off, the patient may be purged with two or three ounces of the common infuſion of ſenna, and one ounce of the ſyrup of buckthorn.

For the ſeveral diſeaſes that ſupervene a ſalivation, ſee each of them ſeparately treated of, under their ſeveral heads.

To prevent the jaws from being locked up, it is neceſſary to uſe a bit of ſtick, covered with a ſoft rag, to be held between his backward teeth; and if there ſhould happen an adheſion of the inſide of the cheek to the gum, the ſame is to be carefully divided. If, during the ſalivation, a blood-veſſel burſt open, it is to be cloſed up with a little pellet, covered with powder of alum or vitriol, and dipped in the tinctura ſtyptica: if it happens from the ſeparation of ſloughs from the ſides of the cheeks, a little oxycrate held in the mouth will do the buſineſs. If the patient has been without a ſtool for ſome time, give him an emollient clyſter of warm milk, ſugar, and oil: and if the fauces ſhould ſuddenly tumify, ſo as to endanger a ſuffocation, the moſt certain relief is to bring the humours downwards by ſharp clyſters and cathartics.

The patient ſhould be prepared for a ſalivation by a lenitive purge or two; and if plethoric, he ſhould bleed: likewiſe bathing in warm water, for ſome hot, lean, emaciated people, has been found of ſervice. Women ſhould be laid down juſt after their menſtrual flux is over. Temperate weather is the moſt ſuitable.

SALIX, the WILLOW, in botany, a genus of the *dioecia-diandria* claſs of plants, having no flower-petals; the nectarium is a very ſmall, cylindric, truncated, melliferous gland, in the center of the flower; the common omentum is oblong, and every where imbricated with oblong, plane, and patent ſquammæ, conſiſting of a ſingle flower; the fruit is an ovato-ſubulated capſule, formed of two valves, and containing only one cell, in which there are ſeveral very ſmall oval ſeeds, crowned with down.

The leaves of the willow are a very grateful food to cattle: a decoction of them is very good in a hæmoptoe; and a clyſter is prepared of the ſame, for a dyſentery. Externally they are of ſervice in baths for the feet, in order to procure ſleep, and cool the heat of fevers; the bark has the like virtues; and beſides, the aſhes thereof are reckoned effectual for extirpating warts and corns.

SALEE, a port-town of the empire of Morocco, in the kingdom of Fez, ſituated on the coaſt of the Atlantic ocean: weſt long. 7°, and north lat. 34°.

SALLET, or SALLAD, a diſh of eatable herbs, ordinarily accompanying roaſt meat, compoſed chiefly of crude freſh herbage, ſeaſoned with ſalt, oil, and vinegar: ſome add muſtard, hard eggs, and ſugar; others pepper; and others ſpices, with orange-peel, ſaffron, *&c.* The principal ſallet-herbs, and thoſe which ordinarily make the baſis of our ſallets, are lettuce, celeri, endive, creſſes, raddiſh and rape; to which are ſometimes added purſlane, ſpinach, ſorrel, tarragon, burnet, corn-ſallet, and chervil.

SALLY, in architecture, is what we more uſually call projecture. See the article PROJECTURE.

SALLY, in the military art, the iſſuing out of the beſieged, from their town or fort, and falling upon the beſiegers in their works, in order to cut them off, nail their cannon, hinder the progreſs of their approaches, deſtroy their works, *&c.*

SALM, a town of Germany, in the dutchy of Lorrain, forty-five miles ſouth-eaſt of Nancy.

SALMO, SALMON, in ichthyology, a genus of the malacopterygious claſs of fiſhes, having large, ſharp, and ſtrong teeth in both jaws, and on the palate, tongue, and fauces; the back-fin is placed nearer the head of the fiſh than the ventral ones; the body is, in moſt of the ſpecies, variegated with ſpots; and the branchioſtege membrane contains ten, eleven, or twelve bones. The ſeveral ſpecies of this fiſh are the common ſalmon, the trout, the red charr, *&c.* See TROUT, *&c.*

The common ſalmo, or ſalmon, with the roſtrum extending beyond the lower jaw, is an inhabitant both of the ſea and rivers; the head is ſmall in proportion to the body; the eyes are round, and their iris of a ſilvery colour, with a faint admixture of green; the pupil is black; the covering of the gills is of a ſilvery colour, and are compoſed of two, or rather of four bony laminæ, and of twelve broad and ſomewhat crooked bones, connected by a membrane; there are ſome irregular black ſpots on them; the lateral line is very ſtraight; the ſcales are moderately large, and placed in an imbricated manner; there is a ſingle ſeries

of

of teeth in the upper and under jaw; there are two more teeth in the upper than the lower jaw; at the ſides of the palate there are two ſeries of teeth in longitudinal lines; the palate itſelf is entirely ſmooth, but deep in the fauces; the tongue is thick, and has on it a few ſharp teeth; there are two fins on the back, the one having fifteen rays, and the other none at all.

SALON, or SALOON, in architecture, a very lofty ſpacious hall, vaulted at top, and ſometimes comprehending two ſtories or ranges of windows. The ſalon is a grand room in the middle of a building, or at the head of a gallery, *&c.* Its faces or ſides ought all to have a ſymmetry with each other; and as it uſually takes up the height of two ſtories, its ceiling, as Daviler obſerves, ſhould be with a moderate ſweep. Salons are frequently built ſquare, and ſometimes octogonal.

SALON is alſo the name of a town of Provence, in France, twenty-four miles ſouth-weſt of Marſeilles.

SALONA, a port-town of Dalmatia, ſubject to Venice: eaſt long. 18°, north lat. 43° 15′.

SALONICHI, a city and port-town of Macedon, in Turky, antiently called Theſſalonica, two hundred and ſixty miles weſt of Conſtantinople: eaſt long. 24°, north lat. 41°.

SALPA, in ichthyology, a ſpecies of the ſparus, with eleven parallel longitudinal yellow lines on each ſide. See SPARUS.

SALSA, in botany, a plant otherwiſe called medeola. See the article MEDEOLA.

SALSETTE, an iſland on the weſtern coaſt of the hither India, ſeparated from that of Bombay by a narrow channel: it belongs to the Portugueſe, and is twenty miles long, and ſeventeen broad.

SALSES, a town of Rouſſillon, ten miles north of Perpignan, and ſubject to France.

SALSOLA, in botany, the name by which Linnæus calls the kali of other botaniſts. See the article KALI.

SALSONNA, a town of Catalonia, in Spain, forty-ſix miles north-weſt of Barcelona.

SALT, *ſal*, in natural hiſtory, the name of a ſeries or ſubdiviſion of foſſils, naturally and eſſentially ſimple, not inflammable, and ſoluble in water.

Dr. Shaw defines ſalt to be a ſubſtance that readily diſſolves in water, taſtes ſharp or pungent upon the tongue, and has a great diſpoſition to unite with earth, ſo as to appear in a ſolid form; as in common ſalt, alum, *&c.*

Salts then are foſſile bodies, friable, pellucid, not inflammable, but fuſible by fire, and congealing again in the cold; ſoluble in water, ſo as to diſappear in it, naturally concreting into regularly figured cryſtals, and impreſſing a ſenſation of acrimony on the tongue. Theſe are the characters and qualities common to all ſalts, and to no other bodies: and theſe they always manifeſt when pure and freed from heterogeneous ſubſtances; but in the ſtate in which they are naturally found in the earth, though they have that in their taſte alone which may ſufficiently diſtinguiſh them, yet they do not exhibit all their genuine characters: ſome of them being found ſolid and pure, either within the earth or on its ſurface, but commonly without their proper form; others embodied in earths and ſtones, as the particles or metals in their ores; and others in a fluid ſtate ſuſpended in waters.

Of the foſſils of this claſs, nature therefore affords us three diſtinct orders, and under thoſe they are diſtinguiſhable into five genera. The ſalts of the firſt order are thoſe found native and pure, either in the earth or without its ſurface, and exhibiting all other natural characters, though often without their proper form. Of the ſecond, are thoſe found not native, but in form of ores, never pure, but diſtinguiſhable by their taſte, and immerſed in and blended with the conſtituent matter of earths and ſtones in extremely ſmall particles. And of the third are thoſe naturally found ſuſpended in waters, and in a fluid form, but ready to aſſume their proper figures on the evaporation of a part of that water.

Of the firſt of theſe orders are the common alimentary ſalt or muria, and the natrum or nitre of the antients; of the ſecond are alum and nitre; and of the third are borax and halcryptium, an alkaline ſalt hid in the chalybeate waters. See the articles NATRUM, ALUM, NITRE, BORAX, and HALCRYPTIUM.

Alimentary ſalt, or muria, is found under a great variety of forms in its different ſtates; but is immediately diſtinguiſhed by applying it to the tongue, and always aſſumes a cubic, pyramidal, or parallelopiped figure after ſolution, and a regular cryſtallization. It is ſuſtained in vaſt quantities in a liquid form among

among ſea-water, and that of ſalt-ſprings; but is alſo found ſolid in the bowels of the earth in vaſt maſſes, which are either of a fine pellucid ſtructure, and called ſal-gem; or various debaſed and ſtriated, reſembling the fibroſe talcs, and is the ſal ammoniac of the antients. See the articles GEM and AMMONIAC.

But in which ever of theſe forms this ſalt is found, it affords the ſame cryſtals on evaporation: theſe, according to the degree of heat uſed in the evaporation, are either pyramidal, cubic, or parallelopiped. All theſe ſalts are ſoluble in water, but they require different quantities of it to diſſolve them, and this makes one of their criterions. This ſalt requires thrice and one ſeventh part its own quantity of water, to make a perfect ſolution.

The ſea-water, in different parts of the world, is very differently ſated with it, ſome parts containing twice as much as others. But that of the ſalt ſprings is always much more ſalted with it, than the ſtrongeſt of the ſea-water: in ſome places it is found loaded with nearly as much as it could be made to contain, ſome ſprings yielding a brine that affords near a quarter of a pound of ſalt, from the pound weight of this liquor, and many of them being ſo ſtrongly impregnated, that the workmen are obliged to let them down or lower them, by mixing them with a large quantity of ſea or common water, before they are fit to be boiled for the ſalt: the common run of ſea-water does not hold ſo much as one fourth part of this quantity, ſome not one eighth of it.

The ſalt produced from the ſea-water of all the parts of the world, and from the brine of all the ſprings of the world, is abſolutely the ſame; but differs in ſtrength, and ſome other qualities, according to the operation by which it is made. In general, the quicker the liquor is evaporated, the weaker is the ſalt; the more time is employed in the proceſs, the ſtronger. This is not wonderful, when we conſider, that, over a gentle heat, water alone, or almoſt alone, evaporates from the liquor, but, over a more violent fire, a part of the ſtrength or acid of the ſalt is raiſed with it.

It is upon this principle, and owing to this cauſe, that we find the ſalt of our ſalt ſprings, which is uſually ſold us under the name of baſket-ſalt, the weakeſt of all. It is not that there is any difference in the waters from which theſe ſeveral kinds of ſalt are produced, that they appear to us in different degrees of ſtrength, but that the people who work the brine-pits, make the ſalt with leſs expence of the workman's time; that the ſea-ſalt is formed over ſomewhat ſlower fires, and that the bay-ſalt is made only by the ſun's heat, where the proceſs is very long, and the heat very moderate, and the ſalt is found ſtrong in proportion. This is ſo indiſputable a truth, that once every week, a very ſtrong ſalt, little inferior to bay-ſalt in that quality, is made at the brine-pit works, where the common run of the ſalt is the weakeſt in the world. The liquor is the ſame in this caſe, but the workmen who do not work on Sundays, leave a pan full to evaporate ſlowly over the fire, which they prepare on the Saturday night, and the moderate heat and length of time under which this weekly parcel of ſalt is made, render it very different from the common ſalt of the works, both in form and qualities: it is found to be made up of large and hard grains, inſtead of the ſmall and ſoft ones of the common kind, and is vaſtly ſuperior to it in ſtrength.

This circumſtance, overlooked by the workmen, and even by their maſters too, for many years, gave the hint to Mr. Lownds, and afterwards to the very ingenious Dr. Browning, author of an excellent treatiſe on this ſubject, to propoſe to the government a method of making a ſtrong ſalt fit for all the purpoſes for which we buy it of our neighbours, only by a new, that is, a ſlower way of working our own brines. The latter of theſe gentlemen has proved, inconteſtably, that we may, if we will encourage proper manufactures, have common ſalt of every kind made at home, equal in ſtrength, and equally fit for all purpoſes, with the ſalt of any part of the world.

After theſe accounts of the muria of common ſalt under its different forms, and as expreſſed by different names, it remains to treat of its qualities and virtues in general.

It reſolves ſpontaneouſly in the air, but this in different times, according to the dampneſs or dryneſs of that element, and according to it own laxer or firmer ſtructure. The coarſer ſalts diſſolve ſooner than the finer, and there are even ſome pieces of ſal gemmæ ſo firm, that they are ſcarce to be at all affected, even on their

their ſurface, by the moiſteſt common air.

Common ſalt, added to aqua fortis, enables it to diſſolve gold, making it into what is called aqua regia; by diſtillation it yields a ſtrong and acid ſpirit; it is the moſt, of all ſubſtances, endued with keeping animal bodies from putrefaction, and it alſo preſerves vegetables in the ſame manner in long digeſtions. In medicine, it is a common ingredient in clyſters, and ſerves to ſoften and bring away indurated fæces. Suppoſitories are alſo made of a mixture of it with honey, and are put up the fundament, to promote a tendency to deſuctions. Aloes and colocynth are ſometimes added on theſe occaſions, when there is required more power in the medicine. In apoplectic caſes, it is generally an ingredient among the ſtimulating things adminiſtered in clyſters; only it is neceſſary to have this caution, that if there appear reaſon to ſuſpect an inflammation of the inteſtines, or but a tendency to it, every thing of this kind is to be avoided.

Common ſalt that has not been expoſed to the fire, makes no change in the colour of ſyrup of violets; it does not make any efferveſcence with oil of tartar, nor does it make lime-water turbid, but added to ſpirit of ſal armoniac, it manifeſts ſome ſigns of a latent acidity, by rendering it cloudy: on the contrary, alſo, it manifeſts ſomething of an alkaline nature, by rendering a ſolution of mercury whitiſh; and it raiſes an efferveſcence with oil of vitriol, attended with heat.

On ſolution in water, common ſalt manifeſts alſo two very different principles after evaporation. When reduced to a proper conſiſtence, that is, when the quantity of water is not more than as three to one to that of the ſalt, a part of it concretes into grains of ſalt of the ordinary kind; but there remains yet in the liquor, after all that can be ſeparated this way has been procured, a ſtrong taſte of a ſaline nature: the ſalt that gives it this, will never be brought to cryſtallize, but muſt be ſeparated by evaporating all the liquor away; it is then found to be of an alkaline nature, aſſuming no regular form in its cryſtals, and eaſily imbibing the humidity of the air, and running into a liquor with it.

The baſis of ſea-ſalt, therefore, is a mineral alkali, which is ſo intimately blended with its peculiar acid, that the latter has ſcarce any power of exerting itſelf. The acid, drawn by diſtillation from ſea-ſalt, turns the ſyrup of violets red, and ferments vehemently, though without heat, with oil of tartar, but it does not heat on being poured into lime-water. This ſpirit is the only one that can be properly called a ſolvent for gold and for tin, but ſilver and lead reſiſt it. The acids of nitre and vitriol, alſo, obtain the ſame qualities on being mixed with it, and become aquæ regales. If this acid be perfectly ſaturated with ſalt of tartar, cryſtals of the form and qualities of thoſe of common ſalt may be obtained from the mixture; theſe cryſtals are called regenerated ſea-ſalt, and ſerve to prove what we obſerved above, that an alkali is the baſis of ſea-ſalt, and that more alkalies than one may ſerve to that purpoſe with the peculiar acid, which is the eſſential part of this ſalt.

Phyſicians are of opinion, that ſea-ſalt has the ſame effects in the human body that it has out of it, in checking fermentation, and preventing putrefaction; they therefore eſteem it of good uſe mixed with the generality of our foods in the ſtomach: they are of opinion alſo, that it carries its effect into the blood, and has the qualities of a moderate dryer, detergent and attenuant, added to thoſe of a ſtimulant, which common reaſon declares it to be. Hence may be deduced all the virtues attributed to ſalt, as an aperient, ſtomachic, or warming medicine, and a provocative to venery; but in what degree it poſſeſſes all theſe qualities, we are, by its univerſal uſe in foods, prevented from being able to determine. Van Helmont recommends it as a good preſervative againſt the ſtone and gravel: he has been ſeverely cenſured for this by others, who are of opinion, that all ſalted foods, ſuch as ſalt beef, and the like, are very bad in thoſe caſes: but both parties may be in the right; for there is a great deal of difference between common ſalt eaten with the freſh juices of our food, and the brine and pickle into which it runs in the time of its being left upon the meat preſerved by it. Salt is very properly put into the mouths of people in apoplectic fits, as it not only irritates but attenuates the juices there, and promotes a diſcharge of them; and in a palſy which affects the tongue, a ſage-leaf, bruiſed and covered with ſalt, has been a famous remedy among the good women, and not without reaſon.

Mixed

Mixed with bran, and heated in a canvas bag, it is recommended to be applied externally to the head in head-achs, ariſing from a moiſt cauſe, and in defluxions; and we find the old phyſicians very ſtrenuouſly recommending a cataplaſm made of the ſame ingredients for pains.

Methods of making alimentary SALT are theſe. 1. By the evaporation of the ſun's rays: this is the moſt eaſy and ſimple method of all, when the waters of ponds and lakes, whether natural or artificial, impregnated with ſalt, being wholly exhaled by the force of the ſun and air, the ſalt is left concreted into a hard cruſt at the bottom of the lake, and is what commonly goes by the name of bay-ſalt; the cryſtals of which differ in ſize, according to the different degrees of heat, and the time it lies in the pits. All bay-ſalt has ſome mud, ſlime, or the like, in the making, and ſome kinds are mixed with the bittern-ſalt, or what is called Epſom ſalt; they are all more white while dry, and more pellucid when moiſt, and they differ in colour, according to the earth which makes the bottoms of the pits. Thus ſome of the french bay-ſalt is grey, ſome reddiſh, and ſome white, according as a blue clay has lined the pits, or a red, or white one. Some kinds have an agreeable ſmell in large heaps; ſuch are the Portugal, and the Hampſhire bay-ſalts; and this ſeems owing to the ſea-water they were made from, having a bituminous matter in it. It differs alſo greatly in taſte, according to the various foreign mixtures it contains; and it will often alter in taſte, and other qualities, by long keeping: for, in general, it is much fitter for uſe, after it has been kept ſome time in a dry place, than when it is firſt made.

2. By boiling or coction; the moſt convenient works for which proceſs are conſtructed in the following manner: the ſaltern or boiling houſe, is erected near the ſea-ſhore, and is furniſhed with a furnace and one or two large pans, which are commonly made of iron-plates, joined together with nails, and the joints filled with a ſtrong cement; and the bottoms of the pans are prevented from bending down, by being ſupported by ſtrong iron-bars.

The ſalt-pan being filled with ſea-water, a ſtrong fire of pit-coal is lighted in the furnace, and then, for a pan which contains about fourteen hundred gallons, the ſalt-boiler takes the whites of three eggs, and incorporates them all with two or three gallons of ſea-water, which he pours into the ſalt-pan, while the water contained therein is only lukewarm, and mixes this with the reſt by ſtirring it about with a rake. In many places they uſe, inſtead of eggs, the blood of ſheep or oxen to clarify the ſea-water; and in Scotland they do not give themſelves the trouble to clarify it at all. As the water heats, there ariſes a black frothy ſcum upon it, which is to be taken off with wooden ſkimmers. After this the water appears perfectly clear, and by boiling it briſkly about four hours, a pan loaded in the common way, that is about fifteen inches deep, will begin to form cryſtals upon its ſurface. The pan is then filled up a ſecond time with freſh ſea-water; and about the time when it is half filled, the ſcratch-pans are taken out and emptied of a white powder, ſeeming a kind of calcarious earth, which ſeparates itſelf from the ſea-water, during its boiling, before the ſalt begins to ſhoot. When theſe have been emptied, they are again put into their places, where they are afterwards filled again. This powder being violently agitated by the boiling liquor, does not ſubſide till it comes to the corners of the pan, where the motion of the maſs is ſmaller, and it there falls into theſe pans placed on purpoſe to receive it.

The ſecond filling of the pan is boiled down after clarifying in the ſame manner as the firſt, and ſo a third and a fourth; but in the evaporation of the fourth, when the cryſtals begin to form themſelves, they ſlacken the fire, and only keep the liquor ſimmering. In this heat they keep it all the while that the ſalt is granulating, which is nine or ten hours. The granules or cryſtals all fall to the bottom of the pan; and when the water is almoſt all evaporated, and the ſalt lies nearly dry at the bottom, they rake it all together into a long heap on one ſide of the pan, where it lies a while to drain from the brine, and then is put into barrows and carried to the ſtore-houſe, and delivered into the cuſtody of his majeſty's officers. In this manner the whole proceſs is uſually performed in twenty four hours, the ſalt being commonly drawn out every morning. This is the method in moſt of our ſalt-works, but in ſome they fill the pan ſeven times before they boil up the ſalt, and ſo take it

it out but once in two days, or five times in a fortnight. In the common way of four boilings, a pan of the uſual ſize, containing one thouſand three hundred gallons, they draw from fifteen to twenty buſhels of ſalt every day, each buſhel weighing fifty-ſix pounds.

When the ſalt is carried into the ſtore-houſe, it is put into drabs, which are partitions, like ſtalls for horſes, lined at three ſides, and the bottom with boards, and having a ſliding board on the fore-ſide to draw up on occaſion. The bottoms are made ſhelving, being higheſt at the back, and gradually inclining forward; by this means the brine remaining among the ſalt, eaſily ſeparates and runs from it, and the ſalt in three or four days becomes ſufficiently dry; in ſome places they uſe cribs and barrows, which are long and conic wicker-baſkets, for this purpoſe; and in ſome places wooden troughs with holes in the bottom. The ſaline liquor which remains from the making of ſalt, is what is called bittern. See the article BITTERN.

Much in the ſame manner is the ſalt obtained from the brine of ſalt ſprings, pits, *&c.* White ſalt is prepared from ſea-water, or any other kind of ſalt-water, firſt heightened into a ſtrong brine by the heat of the ſun, and the operation of the air. It may alſo be prepared from a ſtrong brine, or lixivium, drawn from earths, ſtones, or ſands, ſtrongly impregnated with common ſalt. Refined rock-ſalt is that obtained by diſſolving foſſile or rock-ſalt in ſalt of freſh water, and afterwards boiling the ſolution. And, laſtly, ſalt upon ſalt is made from bay-ſalt diſſolved in ſea-water, or other water, and boiled to a white ſalt.

Preparations of common SALT, in uſe in the ſhops, are, 1. Decrepitated ſalt, thus made: put a quantity of ſalt in an earthen veſſel capable of bearing the action of the fire, cover it with a lid, and ſet it on a moderately ſtrong charcoal fire, heaping up the coals about it as high as the ſalt reaches within; let the lid be taken off at times, and the matter ſtirred well about with an iron-ſpatula. It will make a violent crackling for a long time, but at length the noiſe will ceaſe, and the ſalt be reduced to a dry powder; this is decrepitated ſalt. It is uſed in the cementation of metals, in many other chemical and metallurgical operations, and in diſtilling the acid ſpirit from the ſalt, much trouble and time being ſaved by this previous calcination, though none of the ſpirit will be diſſipated by it. 2. The acid ſpirit of ſea-ſalt, which may be diſtilled by the retort, by mixing two parts of pipe-clay, or the like earth, with one part of decrepitated ſalt; forming the whole into balls with water, and diſtilling theſe after they are dried, in a reverberatory furnace, with a coated retort and a large receiver. Another method of obtaining this ſpirit is this: take ſea-ſalt and oil of vitriol, of each an equal quantity; of common water, a fourth part of the weight of the whole: mix the water and the oil of vitriol together, in an earthen veſſel; then pour them into a retort, and add to them the ſalt by ſmall quantities at a time fit on a receiver, and diſtil the ſpirit by a fire, gentle at firſt, but afterwards raiſed to a conſiderable ſtrength. The mixture of theſe ingredients ſhould be made under a chimney, and the vapours carefully avoided, as being of the moſt fatal ſuffocating kind. This ſpirit is uſed in many metallurgic operations. 3. The ſweet ſpirit of ſalt, made thus: mix together three parts of rectified ſpirit of wine, and one part of ſpirit of ſalt; let them ſtand in digeſtion three weeks or a month, in a tall matraſs. The mixture will in this time acquire a very fragrant ſmell, and is to be preſerved for uſe. It is given in the ſame caſes with the ſweet ſpirit of nitre, and promotes the diſcharges by urine, and therefore is good in the gravel and dropſies: it is alſo recommended in malignant fevers and hernias; its doſe being from five to fifteen drops, in any convenient vehicle. 5. Glauber's ſalt, a very cheap cathartic or purging ſalt. See GLAUBER.

SALT, in chemiſtry, makes one of the leading and moſt active principles, or elements, procurable from mixt bodies. See PRINCIPLE and ELEMENT.

There are three kinds thus obtained, two whereof are volatile, and the third fixed. The volatile, are acrid and urinous ſalts; the fixed, lixivious, or thoſe drawn from aſhes: the urinous and lixivious ſalts are alſo called alkalies, or alkalious ſalts; the former being volatile, and the latter fixed. We do not know the preciſe figure of each of theſe ſalts; but to judge of them by their effects, acid ſalts ſhould ſeem to be pointed, and thoſe points tipped with ſulphureous matter whereas the urinous and lixivious ſalts ſeem to be like a ſponge, containing a

part of the acid, and a little fetid oil. See ACID, ALKALI, and LIXIVIOUS.

Acid ſalts are ranged, by Homberg, under three claſſes, *viz.* ſuch as contain an animal or vegetable ſulphur; as all the acids diſtilled from plants, fruits, woods, &c. and ſpirit of nitre: ſuch as contain a bituminous ſulphur, to which belong the acids of vitriol, common ſulphur, and alum: and ſuch as contain a more fixed mineral ſulphur; as the acids drawn from the ſea ſalt, and ſal gem. Thoſe of the firſt claſs act more ſwiftly than thoſe of the others, and thoſe of the ſecond are the leaſt nimble. Acid ſalts, joined with lixivious ones, compoſe mixed or intermediate ſalts: thus, ſpirit of nitre, with ſalt of tartar, produce a true ſalt-petre; ſpirit of ſalt, with ſalt of tartar, produce true common ſalt; and ſpirit of vitriol, with ſalt of tartar, produce true vitriol; which are all mixed or intermediate ſalts, *i. e.* partly fixed and partly volatile, the ingredients ſtill retaining their original natures. Acids, joined with urinous ſalts, compoſe another ſalt called ammoniac ſalts, which are always volatile.

In all native ſalts, both foſſile, vegetable, and animal, after the violence of the fire has ſeparated all the volatile parts, there ſtill remains a fixed ſalt, to be drawn from the fœces by lotion, or lixiviation; hence called a lixivious ſalt, which is no other but the relics of the acid ſalts, that the fire was not able to ſeparate from the earth of the mixed body, but may be ſeparated by diſſolving them in common water. The taſte of theſe lixivious ſalts is very different, according to the quantity of the acids ſtill remaining after calcination; part of which is ſtill capable of being volatilized by a more intenſe heat, or by diſſolution, digeſtion, filtration, and evaporation frequently repeated; or, by adding ſome urinous ſalt, to abſorb the ſame.

We have three ſorts of urinous ſalts, *viz.* that of plants or animals, which is the ſame; the ſecond is foſſile; and the third of an intermediate kind, partaking both of the foſſile and vegetable nature; the firſt is volatile, and the two latter fixed. By urinous ſalts, we mean all ſuch as partake of the taſte or ſmell of urine; their effect in volatilizing fixed ſalts is well known; for being added to common ſalt, there ariſes, by fire, a volatile ſalt, called ſal ammoniac. However, for volatilizing the fixed ſalts of plants, the urinous ſalts of plants are not ſo proper as the urinous ſalts of the intermediate claſs, ſuch as alum; and for the fixed ſalts of foſſils, the urinous ſalt is fitteſt, *viz.* borax.

All the ſorts of ſalts, then, appear evidently compound and unelementary; and that they are producible *de novo*, and convertible into one another is ſtrenuouſly argued by Mr. Boyle. The two chief qualities wherein they all agree, he obſerves, are to be eaſily diſſoluble in water, and to affect the palate, ſo as to cauſe a ſenſe of taſte. Now that a diſpoſition to be diſſoluble in a liquor, may be acquired by mixture, and a new texture of parts, appears from many inſtances; and as for the taſte, it is ſome queſtion, how far the neceſſity thereof may conſiſt with another principle; for the pureſt oils are ſapid, yet will not diſſolve in water; ſo that there does not appear any ſtrict connection between being ſapid and ſoluble in that fluid.

For acid ſalts, we may inſtance in nitre; which, though it have no acid taſte, may be made to afford by diſtillation, above three quarters of its weight, of a highly acid liquor: yet it does not appear, that ſuch a great proportion of acid particles, or poſſibly any proportion at all, is employed by nature in the compoſition of nitre.

For urinous ſalts, we have an inſtance of their production, in the ſalt obtained by diſtillation from ſoot: for though the wood, we burn in our chimneys, ſeems to have nothing of the taſte or ſmell of urine, nor have the diſſolutions of the ſaline parts of ſuch wood been obſerved to have any affinity, in taſte or odour, thereto; yet when wood is burnt in the fire, and the ſoot afforded by it diſtilled, we get a white volatile urinous ſalt, like what is obtained from blood, urine, or the like.

For lixivious, or the fixed ſalts of calcined bodies, the chemiſts themſelves are not entirely agreed; for however the prevailing opinion may be, that thoſe fixed alkalies pre-exiſt in mixed bodies, Helmont very ingeniouſly propoſes another origin, and holds them, as to their alkaline form, productions of the fire, by whoſe violent action a part of the ſalt, which in the concrete is all naturally volatile, laying hold of ſome parts of the ſulphur of the ſame body, both become melted together, and thus fixed into an alkali.

It

It would, no doubt, contribute greatly to the improvement of chemiſtry, and natural philoſophy, to form a table of the time and quantity wherein all the known ſalts are diſſoluble in water. Epſom-ſalt preſently diſſolves in about an equal quantity of water; common ſalt diſſolves in about four times; nitre, in about five or ſix times; and ſalt of tartar, in about twice its own quantity of water; but cream of tartar requires twenty times its own quantity of boiling water, to diſſolve it. Such a table, regularly formed, might eaſe the trouble of refining ſalts; by ſhewing, at once, how much water each ſalt requires to diſſolve it, for clarification, or cryſtallization. It would likewiſe ſupply us with a ready and commodious way of ſeparating any mixture of ſalts, by ſhewing which would ſhoot out of the mixture firſt upon cryſtallization: for the rule is, that the ſalt which requires the largeſt proportion of water to diſſolve it, will ſhoot the firſt; and thus it is, that nitre is totally ſeparated from common ſalt, in the ordinary proceſs for refining it. The ſame table might alſo direct us to a ready method of ſeparating two ſalts, without waiting for cryſtallization: thus ſuppoſe tartar of vitriol were mixed with epſom-ſalt, if water be poured upon the mixture, it will preſently drink in the epſom-ſalt, leaving the tartar of vitriol untouched; and the ſame is to be underſtood of other mixtures of ſalts.

If, ſays Dr. Shaw, the phyſical reaſon be demanded, why one ſalt more-readily diſſolves in water than another, we recommend it to farther examination, whether all ſalts do not diſſolve in water with greater or leſs facility, and in greater or leſs proportion, according as they contain more or leſs of a groſs, unctuous ſubſtance, unſuitable to the nature or fineneſs and lubricity of parts required in water. The comparing epſom-ſalt, ſalt of tartar, common ſalt, &c. with nitre, alum, crude tartar, &c. he thinks will make this more than a conjecture. Hence, in order to leſſen the trouble and expence of procuring the volatile ſalt of animal ſubjects, they ſhould be firſt purged of their oil and unctuous parts, by boiling in water; after which, they will afford volatile ſalts and ſpirits, as pure, or purer, than thoſe obtained from unboiled hartſhorn.

The ſame gentleman obſerves farther, that the unrectified volatile ſalts of vegetable and animal ſubſtances, are true ſales volatiles oleoſi; and according to the difference of the oil wherein they abound, they are properly diſtinguiſhed into ſalt of hartſhorn, of ox-bone, of human blood, of ſilk, &c. But that when theſe oils are totally ſeparated from them, they become one and the ſame undiſtinguiſhable volatile ſalt; for that it is the admixture of oil that gives the colour to volatile ſalts, they being permanently white when the oil is ſeparated.

Theſe volatile ſalts are obtainable from all kinds of land-animals, the amphibious and ſubterraneous tribe, birds, fiſhes, and reptiles; alſo from alkaline vegetables without putrefaction, and from other vegetables after putrefaction; from ſoot, horns, hoofs, and all refuſe animal and vegetable matters, as urine, the blood of ſlaughter houſes, &c. and this as pure and perfect as from hartſhorn; whence volatile alkalies, and ſal ammoniac, might be afforded very cheap.

The volatile animal, and fixed vegetable ſalts, differ chiefly with regard to their volatility, and fixedneſs, and the effects thereon depending; but agree in other reſpects thus they both make an efferveſcence, and turn neutral, when ſaturated with acids; they are both corroſive, hot, and fiery, &c.

SALT, or SAULT, in the manege, the ſame with leap. See LEAP.

SALTASH, a borough of Cornwal, which ſends two members to parliament, is ſituated twenty miles ſouth of Launceſton.

SALTIER, in heraldry, an ordinary in form of a St. Andrew's-croſs; which may be ſaid to be compos'd of a bend dexter and ſiniſter, croſſing each other in the center of the eſcutcheon. See plate CCXXXVI. fig. 3.

SALT-PETRE, the ſame with nitre. See the article NITRE.

SALTSBURG, the capital of an archbiſhopric of the ſame name, in Bavaria, ſituated on the river Saltza, ſeventy miles eaſt of Munich: eaſt long. 13°, north lat. 47° 45'.

SALVAGE MONEY, a reward allowed by the civil and ſtatute law, for the ſaving of ſhips or goods from the danger of the ſeas, pirates, or enemies.

Where any ſhip is in danger of being ſtranded, or driven on ſhore, juſtices of the peace are to command the conſtables to aſſemble as many perſons as are neceſſary to preſerve it; and on its being preſerved by their means, the perſons

assisting therein shall in thirty days after be paid a reasonable reward for the salvage, otherwise the ship or goods shall remain in the custody of the officers of the customs, as a security for the same.

SALVATELLA, in anatomy, a branch of the axillary vein, which runs over the back of the hand towards the little finger.

SALVATERRA, a town of Spain, in the province of Estremadura: west long. 7° 5′, north lat. 38° 30′.

SALVATIERRA, a town of Spain, in the province of Galicia, fifty miles south of Compostella.

SALVE REGINA, among the romanists, a latin prayer addressed to the Virgin Mary, and sung after complines; also at the execution of criminals.

SALVER, a plate, commonly of silver, and supported with a foot; used to set glasses on, to serve wine and other liquors.

SALVIA, *sage*, in botany, *&c.* See SAGE.

SALVINIA, or MARSILEA, in botany. See MARSILEA.

SALUTATION, the act of saluting, greeting, or paying respect and reverence to any one.

There is a great variety in the forms of salutation. The orientals salute by uncovering their feet, laying their hands on their breasts, *&c.* In England, we salute by uncovering the head, bending the body, *&c.* The pope makes no reverence to any mortal, except the emperor, to whom he stoops a very little, when he permits him to kiss his lips. A prince, or person of extraordinary quality, is saluted at his entering a garrison by the firing of the cannon round the place. In the field, when a regiment is to be reviewed by a king, or his general, the drums beat, as he approaches, and the officers salute him one after another, as he passes by, stepping back with the right foot and hand, bowing their half pikes to the ground, and then recovering them gently, bringing up the foot and hand, and planting them; which done, they pull off their hats without bowing. The ensigns salute all together, bringing down their colours near the ground directly before them at one motion, and having taken them up again, gently lift their hats.

At sea, they salute by a discharge of cannon, which is greater or less, according to the degree of respect they would shew; and here ships always salute with an odd number of guns, and galleys with an even one. To salute with muskets is to fire one, two, or three volleys; which is a method of salutation that sometimes precedes that of cannon, and is chiefly used on occasion of feasts. After the cannon, they also sometimes salute or hail with the voice, by a joint shout of all the ship's company, repeated three times; which salutation also occasionally obtains where they carry no guns, or do not care to discharge any. Saluting with the flag is performed two ways, either by holding it close to the staff so as it cannot flutter, or by striking it so as it cannot be seen at all, which is the most respectful. Saluting with the sails is performed by hovering the topsails half-way of the masts. Only those vessels that carry no guns salute with the sails.

SALUZZO, a city of Italy, the capital of a marquisate of the same name in Piedmont, seventeen miles south of Turin.

SALZ, SULZ, SALTZ, or SULTZ, a sort of brine or pickle made of salt dissolved by the coldness or moisture of a cellar.

SAMARCAND, a city of Usbec Tartary, formerly its capital: east lon. 66°, north lat. 40°.

SAMARIA, an antient city of Palestine, in asiatic Turky, forty-five miles north of Jerusalem.

SAMARITANS, an antient sect among the Jews, still subsisting in some parts of the Levant, under the same name.

Its origin was in the time of Rehoboam, under whose reign the people of Israel were divided into two distinct kingdoms, that of Judah and that of Israel; when the capital of the latter being Samaria, the Israelites obtained the name of Samaritans.

They were antiently guilty of idolatry, and the rabbins pretend, that they worshipped the figure of a dove on mount Gerizim; but the present Samaritans, who are but few in number, are far from being idolaters. They celebrate the passover every year, on the fourteenth day of the first month, on mount Gerizim, and begin that feast with the sacrifice appointed for that purpose in Exodus: they keep the sabbath with all the rigour with which it is injoined in the book of Exodus; none among them stirring out of doors but to the synagogue: they sacrifice no where but on mount Gerizim: they observe the feasts of expiation, tabernacles,

bernacles, harveſt, &c. and never defer circumciſion beyond the eighth day; they never marry their nieces as the Jews do; have but one wife; and in fine, do nothing but what is commanded in the law.

SAMARITAN MEDALS, ſome antient medals in the cabinets of our antiquaries, the inſcriptions and legends of which are in hebrew; but the character different from the hebrew of our bibles, which is the ſquare hebrew, or chaldee; from this character, and not from their being ſtruck by the Samaritans, they are denominated Samaritan.

Of theſe there are four kinds: the firſt bear expreſsly the name of Simon, and the ſubject for which they were ſtruck, *viz.* the deliverance of Jeruſalem. The ſecond have not the name Simon, but only the deliverance of Sion or Jeruſalem. The third, have neither Simon, nor the deliverance of Sion; but only the epochas, firſt year, ſecond year, &c. The fourth claſs have neither any inſcriptions, nor any thing whence we may judge of the time when they were ſtruck. The three firſt were certainly ſtruck by the Jews, after their return from the babyloniſh captivity, and in the time of Simon Maccabeus, after Jeruſalem had been freed from the yoke of the greeks; but though they were ſtruck after the captivity, the learned jeſuit Souciet obſerves, that their character ſhews itſelf to be that of the antient hebrew, the uſe of which was loſt by the people during their ſojourn in Babylon and Chaldæa; but was again reſtored after their return, on the ſame footing as before.

SAMBALLAS, or SAMBLAS ISLANDS, ſeveral iſlands ſituated in the american ocean, near the coaſt of Darien, none of which are inhabited: eaſt long. 81° north lat. 10°.

SAMBRE, a river of the Netherlands, which riſes in the confines of Picardy, and falls into the Maeſe at Namur.

SAMBUCUS, the ELDER, in botany, a genus of the *pentandria-trigynia* claſs of plants, the flower of which conſiſts of a ſingle rotated ſemiquinquifid petal; its fruit is a roundiſh unilocular berry, containing three ſeeds, convex on one ſide, and angulated on the other.

The inner green bark of this ſhrub is gently cathartic: an infuſion of it in wine, or its expreſſed juice, in the doſe of half an ounce, or an ounce, is ſaid to purge moderately; and in ſmall doſes, to prove an efficacious deobſtruent, capable of promoting all the fluid ſecretions. The young buds, or rudiments of the leaves, are ſtrongly purgative, but are reckoned unſafe. The expreſſed juice, inſpiſſated to the conſiſtence of a rob, proves an uſeful aperient medicine, which is good in obſtructions of the viſcera, and promotes the natural evacuations.

SAMBUCUS, is alſo an antient muſical inſtrument of the wind-kind, reſembling a flute; probably thus called, becauſe made of elder.

SAMIAN EARTH, in the materia medica, the name of two ſpecies of marl uſed in medicine, *viz.* 1. The white kind, called by the antients, collyrium ſamium; being aſtringent, and therefore good in diarrhæas, dyſenteries, and hæmorrhages; they alſo uſed it externally in inflammations of all kinds. 2. The browniſh-white kind, called after ſamius, by Dioſcorides: this alſo ſtands recommended as an aſtringent. See MARL.

SAMOGITIA, a maritime province of Poland, bounded by Courland on the North, and by the Baltic on the weſt.

SAMOIDA, the moſt northerly province of Ruſſia in Europe, ſituated on the frozen ocean, and the river Oby.

SAMOLUS, in botany, a genus of the *pentandria-monogynia* claſs of plants, the corolla whereof conſiſts of a ſingle petal, the tube is very ſhort, only the length of the cup, and patalous; the limb is plane and divided into five ſegments, and there are placed five connivent ſquammulæ at the baſe of the ſinus of the limb; the fruit is an oval capſule ſurrounded by the cup, and containing only one cell; the ſeeds are numerous, oval and ſmall.

SAMOS, a fertile iſland of the Archipelago, thirty miles ſouth of Smyrna: eaſt long. 27° 30′, north lat. 37° 30′.

SAMOSATENIANS, in church-hiſtory, the ſame with paulianites. See the article PAULIANITES.

SAMOTHRACIA, a ſmall iſland in the Egean ſea, near the coaſt of Thrace.

SAMPSEANS, in church-hiſtory, an antient ſect, who were properly neither jews, chriſtians, nor gentiles, though they took their name from the hebrew word *ſemes*, ſun; as though they worſhipped that planet.

They acknowledged only one God; waſhed themſelves often; and in almoſt every thing attached themſelves to the religion

ligion of the Jews. Many among them abſtained wholly from eating of fleſh. Scaliger will have the ſampſeans to be the ſame with the eſſeni; and indeed the ſampſeans, eſſeni, elceſaites, and maſſalians, appear to be no more than ſo many different names for the ſame ſect.

SAMYDA, in botany, a genus of the *icoſandria-monogynia* claſs of plants, the calyx of which is ſituated under the germen, and it has no corolla or flower petals.

SANAMUNDA, in botany, *&c.* the ſame with the empetrum, or heath ſpurge.

SANBENEDITO, a town of Italy, in the dutchy of Mantua, nine miles ſouth of the city of Mantua.

SAN BENITO, or SACO BENITO, a kind of linnen-garment worn by perſons condemned by the inquiſition. See the articles INQUISITION and *Act of* FAITH.

SANCTIFICATION, the act of ſanctifying, or rendering a thing holy.

The reformed divines define ſanctification to be an act of God's grace, by which a perſon's deſires and affections are alienated from the world, and by which he is made to die to ſin, and to live to righteouſneſs; or, in other words, to feel an abhorrence of all vice, and a love of virtue and religion.

SANCTION, the authority given to a judicial act, by which it becomes legal and authentic.

Thus the royal aſſent gives a ſanction to all bills that have paſſed both houſes of parliament.

Pragmatical SANCTION. See the article PRAGMATICAL.

SANCTI VITI CHOREA. See the article VITUS's DANCE.

SANCTUARY, among the Jews, alſo called ſanctum ſanctorum, or holy of holies, was the holieſt and moſt retired part of the temple of Jeruſalem, in which the ark of the covenant was preſerved, and into which none but the high prieſt was allowed to enter, and that only once a year, to intercede for the people.

Some diſtinguiſh the ſanctuary from the ſanctum ſanctorum, and maintain that the whole temple was called the ſanctuary.

To try and examine any thing by the weight of the ſanctuary, is to examine it by a juſt and equal ſcale: becauſe, among the Jews, it was the cuſtom of the prieſts to keep ſtone weights, to ſerve as ſtandards for regulating all weights by, though theſe were not at all different from the royal, or profane weights.

Sanctuary, in the romiſh church, is alſo uſed for that part of the church in which the altar is placed, incompaſſed with a rail or balluſtrade.

SANCTUARY, in our antient cuſtoms, is the ſame with aſylum. See ASYLUM.

SAND, *arena*, in natural hiſtory, a genus of foſſils, the characters of which are, that they are found in minute concretions; forming together a kind of powder, the genuine particles of which are all of a tendency to one determinate ſhape, and appear regular, though more or leſs compleat concretions; not to be diſſolved or diſunited by water, or formed into a coherent maſs by means of it, but retaining their figure in it; tranſparent, vitrifiable by extreme heat, and not diſſoluble in, nor efferveſcing with, acids.

Sands are ſubject to be variouſly blended both with homogene and heterogene ſubſtances, as that of talcs, *&c.* and hence, as well as from their various colours, are ſubdivided into, 1. White ſands, whether pure or mixed with other arenaceous or heterogeneous particles; of all which there are ſeveral ſpecies, differing no leſs in the fineneſs of their particles, than in the different degrees of colour, from a bright and ſhining white, to a browniſh, yelloviſh, greeniſh, *&c.* white. 2. The red and reddiſh ſands, both pure and impure. 3. The yellow ſands, whether pure or mixed, are alſo very numerous. 4. The brown ſands, diſtinguiſhed in the ſame manner. 5. The black ſands, whereof there are only two ſpecies, *viz.* a fine ſhining greyiſh-black ſand, and another of a fine ſhining reddiſh-black colour. 6. The green kind, of which there is only one known ſpecies, *viz.* a coarſe variegated duſky green ſand, common in Virginia.

Sand is of great uſe in the glaſs-manufacture; the white writing ſand being employed for making of the white glaſs, and a coarſe greeniſh-looking ſand for the green glaſs.

In agriculture, it ſeems to be the office of ſand to make unctuous earths fertile, and fit to ſupport vegetables, *&c.* For earth alone, we find, is liable to coaleſce, and gather into a hard coherent maſs, as appears in clay; and being thus embodied, and as it were glued together, is no way diſpoſed to nouriſh vegetables. But if ſuch earth be mixed with ſand,

its pores are thereby kept open, and the earth itſelf looſe, ſo as thus to give room for the juices to aſcend, and for plants to be nouriſhed thereby. A vegetable planted only in ſand, or in a fat glebe, or in earth, receives little growth or increaſe; but a mixture of both renders the maſs fertile. In effect, earth is in ſome meaſure made organical by means of ſand; pores and ſpaces, ſomething analogous to veſſels, being thereby maintained, by which the juices may be conveyed, prepared, digeſted, circulated, and at length diſcharged.

Common ſand is a very good addition, by way of manure, to all ſorts of clay-lands; it warms them, and makes them more open and looſe. The beſt ſand for the farmer's uſe is that which is waſhed by rains from roads or hills, or that which is taken from the beds of rivers; the common ſand that is dug in pits never anſwers nearly ſo well. However, if mixed with dung, it is much better than laid on alone: and a very fine manure is made by covering the bottom of ſheep-folds with ſeveral loads of ſand every week, which are to be taken away, and laid on cold ſtiff lands, impregnated as they are with the dung and the urine of the ſheep.

Beſide clay-land there is another ſort of ground very improveable by ſand; this is that ſort of black foggy land on which buſhes and ſedge grow naturally, and which they cut into turf, in ſome places. Six hundred load of ſand being laid upon an acre of this land, according to the Cheſhire-meaſure, which is near double the ſtatute-acre, meliorate it ſo much, that without plowing, it will yield good crops of oats or tares, though before it would have produced ſcarce any thing. If this crop is taken off, the land be well dunged, and laid down for graſs, it will yield a large crop of ſweet hay.

Once ſanding this land will improve it for a vaſt number of years, and it will yield two crops of hay in the year, if there be weather to make it in. Some land in Cheſhire has been, by this means, rendered of twelve times its former value to the owner. The bogs of Ireland, when drained, have been rendered very fruitful land, by mixing ſand in this manner among the earth, of which they conſiſt. Add to this, that in all theſe boggy lands, the burning them, or firing their own turf upon them, is alſo a great advantage. The common peat, or turf-aſhes, mixed with the ſand for theſe purpoſes, add greatly to its virtue. Sea-ſand, which is thrown up in creeks and other places, is by much the richeſt of all ſand for manuring the earth; partly its ſaltneſs, and partly the fat and unctuous filth that is mixed among it, give it this great virtue. In the weſtern parts of England, that lie upon the ſea-coaſt, they make very great advantages of it. The fragments of ſea-ſhells alſo, which are always in great abundance in this ſand, add to its virtues; and it is always the more eſteemed by the farmers, the more of theſe fragments there are among it.

The ſea-ſand, uſed as manure in different parts of the kingdom, is of three kinds: that about Plymouth, and on other of the ſouthern coaſts, is of a blue-grey colour, like aſhes, which is probably owing to the ſhells of muſcles, and other fiſh of that or the like colour, being broken and mixed among it in great quantity. Weſtward, near the land's end, the ſea-ſand is very white, and about the iſles of Scilly it is very gliſtering, with ſmall particles of talc; on the coaſts of the north ſea, the ſand is yellowiſh, brown, or reddiſh, and contains ſo great a quantity of fragments of cockle-ſhells, that it ſeems to be chiefly compoſed of them. That ſea-ſand is accounted beſt, which is of a reddiſh colour: the next in value to this is the bluiſh, and the white is the worſt of all. Sea-ſand is beſt when taken up from under the water, or from ſand-banks, which are covered by every tide. The ſmall grained ſand is moſt ſudden in its operation, and is therefore beſt for the tenant who is only to take three or four crops; but the coarſe or large grained ſand is much better for the landlord, as the good it does laſts many years.

When the land has been well manured with the large ſand, they take four crops of corn from it, and then lay it down for paſture for ſix or ſeven years before they plow it again. The graſs is ſo good, that they commonly mow it for hay the firſt year; it always abounds very much with the white-flowered clover. If the graſs grows but ſhort, it is the farmer's intereſt to feed his cattle upon it, and it will turn to as good account this way, being very ſweet and rich, and making the cattle fat, and the cows yield a very large quantity of milk.

SAN-

SANDBACH, a market-town twenty-two miles eaſt of Cheſter.

SAND-BAGS, in the art of war, are bags filled with earth or ſand, holding each about a cubic foot: their uſe is to raiſe parapets in haſte, or to repair what is beaten down.

SANDECK, a town of little Poland, thirty-five miles ſouth-eaſt of Cracow.

SAND-EEL, *ammodytes*, in ichthyology. See the article AMMODYTES.

SAND-FLOOD, a terrible miſchief, incident to the lands of Suffolk, and ſome other parts of England; which are frequently covered with vaſt quantities of ſand, rolling in upon them like a deluge of water, from ſandy hills in their neighbourhood.

The beſt way of ſtopping its progreſs is, by hedges of furze, planted one over another as they become level.

SAND-LANDS, or SANDY LANDS, in agriculture, are made up of ſands of different colours and qualities; as white, blackiſh, reddiſh, or yellowiſh; and in the ſize of their particles, ſome being milder or harſher, and others very light, ſeeming mere duſt. The grey, black, and aſh-coloured ſands, are the worſt of all, and are generally found on heaths and commons.

The moſt ſuitable plants for arable lands of this kind, are white oats, rye, black wheat, and turneps: the natural produce in weeds, is quick-graſs, ſorrel, broom, furze, fern, and heath. The beſt manure for them is either marl, or ſuch clay as will break with the froſts. Cow-dung is alſo ſaid to be good for ſuch lands; and many uſe with ſucceſs chalk, mud, and the half rotten ſtraw of dunghills.

SANDAL, in antiquity, a rich kind of ſlipper, worn on the feet by the greek and roman ladies, made of gold, ſilk, or other precious ſtuff, conſiſting of a ſole, with an hollow at one extreme to embrace the ancle, but leaving the upper part of the foot bare.

Sandal, is alſo uſed for a ſhoe or ſlipper worn by the pope, and other romiſh prelates, when they officiate. It is alſo the name of a ſort of ſlipper worn by ſeveral congregations of reformed monks. This laſt conſiſts of no more than a mere leathern ſole, faſtened with latches or buckles, all the reſt of the foot being left bare. The capuchins wear ſandals, the recollects, clogs: the former are of leather, and the latter of wood.

SANDARACH, in natural hiſtory, a very beautiful native foſſil, though too often confounded with the common factitious red arſenic, and with the red matter formed by melting the common yellow orpiment.

It is a pure ſubſtance, of a very even and regular ſtructure, is throughout of that colour which our dyers term an orange-ſcarlet, and is conſiderably tranſparent even in the thickeſt pieces. But though with reſpect to colour, it has the advantage of cinnabar while in the maſs, it is vaſtly inferior to it when both are reduced to powders. It is moderately hard, and remarkably heavy, and when expoſed to a moderate heat, melts and flows like oil: if ſet on fire, it burns very briſkly.

It is found in Saxony and Bohemia, in the copper and ſilver mines, and is ſold to the painters, who find it a very fine and valuable red: but its virtues or qualities in medicine, are no more aſcertained at this time, than thoſe of the yellow orpiment.

Gum-SANDARACH, is a dry and hard reſin, uſually met with in looſe granules, of the bigneſs of a pea, a horſe-bean, or larger; of a pale whitiſh yellow, tranſparent, and of a reſinous ſmell, brittle, very inflammable, of an acrid and aromatic taſte, and diffuſing a very pleaſant ſmell when burning. It is produced from a ſpecies of the juniper, and the cedrus baccifera. See JUNIPER.

It flows only from theſe trees in hot countries; but the natives promote its diſcharge by making inciſions in the bark.

What is obtained from the cedar is more fragrant, eſpecially when burnt; but it is ſeldom to be met with ſeparate in the ſhops, both being mixed together under the common name of ſandarach.

Sandarach is good in diarrhœas, and in hæmorrhages; where its doſe is from ten grains to half a dram: it is alſo ſometimes preſcribed in gonorrhœas, and the fluor albus; but at preſent it is much diſuſed in medicine. It is, however, much uſed by our writing-maſters, who make a powder of it which they call pounce.

The varniſh-makers make a kind of varniſh of it by diſſolving it in oil of turpentine, or linſeed, or in ſpirit of wine. See VARNISH.

Gum-

Gum-ſandarach, on its being imported, pays a duty of 5s. $5\frac{10}{100}$d. the 112 pounds, and on exportation draws back 4s. $9\frac{12}{100}$d.

SANDIVER, a whitiſh ſalt, continually caſt up from the metal, as it is called, whereof glaſs is made; and ſwimming on its ſurface, is ſkimmed off. See the article GLASS.

Sandiver is alſo plentifully thrown out in the eruptions of vulcanos; ſome is of a fine white, and others tinged blueiſh, or yellowiſh.

Sandiver is detergent, and good for foulneſſes of the ſkin. It is alſo uſed by gilders of iron. See GILDING.

SANDIX, a kind of minium, or red-lead, made of ceruſe; but much inferior to the true minium. See the articles MINIUM and CERUSE.

SANDOMIR, a city of little Poland, and capital of a Palatinate of the ſame name, eighty miles north-eaſt of Cracow.

SANDVLIET, a town of Brabant, ten miles north of Antwerp.

SAND WALK. See WALK.

SANDWICH, one of the cinque-ports, in Kent, ten miles eaſt of Canterbury: it ſends two members to parliament, and gives the title of earl to the noble family of Montague.

SANE MEMORY, in law, denotes ſound and perfect memory to do any lawful act. See MEMORY and COMPOS.

SANGUESSA, a town of Spain, twenty miles ſouth of Pampeluna: weſt long. 1° 30′, north lat. 42° 40′.

SANGUIFICATION, in the animal œconomy, the converſion of chyle into true blood. See the articles CHYLE, CHYLIFICATION and BLOOD.

Blood is formed from chyle by various and ſucceſſive degrees. A few hours after meals, the chyle is found conveyed into the blood, though not aſſimilated. Hence, when after a liberal meal blood is taken from the vein, beſides the ſerum and the red part, there is a white, ſweet, and chylous part found fluctuating in the blood. In a few hours the chyle, conveyed with the blood through the veſſels, is ſeparated from the blood by the fabric of the breaſts, and affords milk, which is of a different nature both from blood and chyle; for in milk there begins to be formed that tendency to concretion which is already preſent in the ſerum of the blood, for it yields cheeſe. But this tendency to concretion is never found in the chyle. Hence we may artificially imitate the preparation of chyle in emulſions, but never the nature of milk.

When a ſound woman for twelve hours totally abſtains from meat and drink, her milk begins to be ſaline and yellowiſh. If ſhe abſtains ſtill longer, nothing is found in the blood taken from her veins, but what (like the white of an egg) is by means of the fire concreted, which never happens in the chyle.

Hence we may conclude that the bodies of ſound perſons are the formers and producers of their own blood, in the ſame manner as any plant, by its peculiar fabric, prepares its ſap from the juices of the fertile earth and the genial influences of the circumambient air.

But in the human body the formation of blood depends principally upon the efficacy of the circulation, by which the veſſels act upon their contained fluids. Hence in the moſt robuſt perſons the blood is reddeſt, or rather almoſt black, in conſequence of its ſaturated red colour, and is concreted almoſt the very moment it is left in a ſtate of reſt. And in acute diſeaſes, when the circulation is increaſed, all the parts are intenſely red, and the ſerum of the blood is converted into a ſciſſile maſs. But in weak perſons in whom the efficacy of the circulation is far leſs, all the parts are pale and languid, whilſt the blood is thin and hardly capable of concretion. But when in ſuch perſons, with due exerciſe and proper remedies, the circulation is augmented, the red colour and due coheſion of the blood return.

SANGUINARIA, BLOOD-WORT, a genus of the *polyandria-monogynia* claſs of plants, the flower of which conſiſts of eight very patent petals; and the fruit is an oblong ventricoſe capſule, containing a great many roundiſh and acuminated ſeeds.

SANGUINE, in general, ſomething abounding with, or reſembling blood. See the article BLOOD.

Among heralds, the term ſanguine is often given to the colour more uſually called murrey; being made of red lake tinged with a little ſpaniſh brown; it is chiefly uſed in the coats of the knights of the bath, and is repreſented, in engraving, by hatches like thoſe of purpure. See the article PURPURE.

SANGUINE-STONE, *lapis hæmatites*. See the article HÆMATITES.

SANGUIS, BLOOD, in the animal œconomy. See the article BLOOD.

SANGUIS DRACONIS, *dragon's-blood*, in pharmacy. See DRAGON.

SANGUIS HIRCI, *goat's-blood*, in pharmacy, the dried blood of a middle-aged goat, which is eſteemed in Germany as a ſudorific, and a great medicine in pleuriſies; but with us is little regarded.

SANGUISORBA, BURNET, in botany, a plant of *tetrandria-monogynia* claſs, with a monopetalous flower, divided into four deep ſegments, cohering only at the ungues; the fruit is a ſmall bilocular capſule, containing very ſmall ſeeds.

The great burnet, ſanguiſorba major, is celebrated as a cordial, ſudorific, and aſtringent; but though great cures are ſaid to have been effected by it, the preſent practice neglects it.

SANGUISUGA, in zoology, a name given to the hirudo or leech. See the article LEECH.

SANHEDRIM, or SANHEDRIN, among the Jews, the great council of the nation, conſiſting of ſeventy ſenators, taken partly from among the prieſts and levites, and partly out of the inferior judges, who formed what was called the leſſer ſanhedrim. The room they met in, was a rotunda, half of which was built without the temple, and half within. The naſi, or preſident of the ſandrehim, ſat upon a throne, with his deputy on his right hand, his ſub-deputy on his left, and the other ſenators ranged in order on each ſide.

The authority of this council was very extenſive, for they decided ſuch cauſes as were brought before them by way of appeal from the inferior courts; and the king, the high-prieſts, and prophets were under the juriſdiction of this tribunal. They had the right of judging in capital caſes, and ſentence of death might not be pronounced in any other place; for which reaſon the Jews were forced to quit this hall, when the power of life and death was taken out of their hands, forty years before the deſtruction of the temple, and three years before the death of Chriſt.

There were ſeveral inferior ſanhedrims in Paleſtine, each of which conſiſted of twenty-three perſons; all theſe depended on the great ſanhedrim of Jeruſalem.

SANICLE, *ſanicula*, in botany, a genus of the *pentandria-digynia* claſs of plants, with an umbelliferous flower; each partial one being compoſed of five compreſſed and bifid petals; the fruit is compoſed of two ſeeds, plane on one ſide, and convex and ſcabrous on the other. See plate CCXXXVI. fig. 4.

The leaves of this plant have long been celebrated for their vulnerary qualities, both internally and externally; but are, nevertheleſs, diſregarded by the preſent practitioners.

SANIES, in medicine, a ſerous putrid matter, iſſuing from wounds; it differs from pus, which is thicker and whiter.

SAN MATHEO, a town of Spain, in the province of Valencia, fifty-five miles north of the city of Valencia.

SANQUHAR, a borough town of Scotland, in the county of Nithſdale, twenty-one miles north of Dumfries.

SANTA CLARA, an iſland in the Pacific Ocean, ſituated in the bay of Guyaquil: weſt long. 80°, ſouth lat. 3° 15′.

SANTA CRUZ, a port-town on the north ſide of the iſland of Cuba, in north America: weſt long. 85° 30′, north lat. 22° 30′.

SANTA FE, the capital of New Mexico: weſt long. 109°, north lat. 36°.

SANTA FE DE BAGOTA, the capital of Terra Firma, in ſouth America: weſt long. 74°, north lat. 4° 30′.

SANTA MARIA, a town of Terra Firma, in the province of Darien, ſituated on a river of the ſame name, a little eaſt of the bay of Panama: weſt long. 80°, north lat. 7° 40′.

SANTALUM, SAUNDERS, in the materia medica, a hard, odoriferous medicinal wood, brought from the Eaſt-Indies, of which there are three ſorts, *viz.* the yellow, white and red: the yellow or citrine ſaunders, is a beautiful wood; of the colour of lemon-peel; of a ſmell ſomewhat like a mixture of muſk and roſes, and of a ſomewhat acrid and aromatic taſte, with a ſlight bitterneſs. The white ſaunders reſembles the yellow, and is of the ſame fragrant ſmell and aromatic taſte, but in a more remiſs degree. Both theſe ſorts ſhould be choſen ſound, firm, heavy, and of a good ſmell when cut; they ſhould alſo be choſen in the block, and not cut into chips as they uſually are, for in this manner they ſoon loſe much of their virtue. The red ſaunders is of a denſe and compact texture, remarkably heavy and very hard. It is brought to us in logs of conſiderable length, the out part of which is of a duſky, and the inner of a blood red; it has but little ſmell, and is of an auſtere taſte.

All theſe ſorts are attenuants, and all have an aſtringency, but the red moſt of all. They are accounted cordials, and are ſaid to be good in obſtructions of the viſcera; but they are little uſed, except as ingredients in ſome of the compoſitions of the ſhops.

Santalum is a plant of the *octandria-monogynia* claſs, with a monopetalous campanulated flower, and a berry for its fruit.

SANTAREN, a city of Portugal, in the province of Eſtremadura, ſituated on the river Tagus, fifty miles north-eaſt of Liſbon.

SANTEN, a town of Germany, in the circle of Weſtphalia and dutchy of Cleeve, fifteen miles ſouth-eaſt of the city of Cleeve, ſubject to Pruſſia.

SANTERRE, the ſouthern diviſion of Picardy, in France.

SANTILLANA, a city and port-town of Spain, the capital of the eaſtern Aſturia, ſituated on the bay of Biſcay: weſt lon. 5°, and north lat. 43° 35′.

SANTOLINA, FEMALE SOUTHERN-WOOD, or LAVENDER-COTTON, a plant of the *ſyngeneſia-polygamia* claſs, the compound flower of which is uniform, conſiſting of a number of infundibuliform hermaphrodite corollulæ, quinquifid at the limb; which are each followed by a ſingle ſeed, contained in the cup.

The medicinal virtues aſcribed to ſantolina, are, in general, the ſame with thoſe of the abrotanum mas, or male ſouthernwood: it is however particularly recommend in uterine complaints; and its ſeed is good for deſtroying worms. See the article SOUTHERN-WOOD.

SANTOLINOIDES, or ANACYCLUS, in botany, a plant nearly allied to the cotula, the compound flower of which is radiated; the diſc being occupied by funnel-ſhaped hermaphrodite corollulæ, quinquifid at the limb; and the female flowers are ligulated; there are five capillary and very ſhort ſtamina; and the ſeeds are ſingle, after each partial flower.

SANTORINI, an iſland of the Archipelago, thirty-five miles in circumference: eaſt longit. 25° 35′, north lat. 36° 10′.

SAONE, a river of France, which riſes in Lorrain, and falls into the Rhone, at Lyons.

SAP, in phyſiology, a juice furniſhed by the earth, and changed into the plant, conſiſting of foſſil parts, other parts derived from the air and rain, and others from putrified animals, plants, *&c.* See the article JUICE.

This juice enters the plant in form of a fine and ſubtile water, which the nearer it is to the root, the more it retains of its proper nature; and the farther from the root, and the more action it has ſuſtained, the nearer it approaches to the nature of the vegetable: conſequently, when the juice enters the root, it is earthy, watry, poor, acid, and ſcarcely oleaginous at all. In the trunk and branches it is farther prepared, though it ſtill continues acid, as we find by tapping a tree in the month of February. The ſap being here carried to the germs or buds, is more concocted; and here having unfolded the leaves, theſe come to ſerve as lungs for the circulation and farther preparation of the juice. By ſuch means is the ſap ſtill farther altered and digeſted, as it is farther in the petals or leaves of the flowers, which tranſmit the juice, now brought to a farther ſubtility, to the ſtamina; theſe communicate it to the farina, or duſt, in the apices, which is, as it were, the male ſeed of the plant; where, having undergone a farther maturation, it is ſhed into the piſtil, which performs the office of an uterus or womb: and thus having acquired its laſt perfection, it gives riſe to a new fruit or plant. The ſap having thus gone its ſtage, from the root to the remote branches, and even the flower; and having, in every part of its progreſs, depoſited ſomething both for aliment and defence, what is redundant paſſes out into the bark, the veſſels of which are inoſculated with thoſe in which the ſap mounts; and through which it deſcends to the root, and thence to the earth again. And thus a circulation is effected. See the article CIRCULATION.

SAP, or SAPP, in the art of war, is the digging deep under the earth of the glacis, in order to open a covered paſſage into the moat. It is only a deep trench, covered at top with boards, hurdles, earth, ſand-bags, *&c.* and is uſually begun five or ſix fathoms from the ſalliant angle of the glacis. See FORTIFICATION and APPROACH.

SAPATA, or ZOPATA. See ZOPATA.

SAPINDUS, the SOAPBERRY-TREE, in botany, a plant of the *octandria-trigynia* claſs, the flower of which conſiſts of four oval petals; and the fruit of three capſules, each including a globoſe nut.

The berries of this tree are uſed for waſhing, inſtead of ſoap, whence the engliſh name.

SAPINUS, a name uſed by ſome for the fir-tree. See the article ABIES.

SAPO, SOAP. See the article SOAP.

SAPONARIA, SOAPWORT, in botany, a plant of the *decandria-digynia* claſs, the flower of which conſiſts of five petals, with a plane limb; and its fruit an unilocular capſule, containing a number of ſmall ſeeds.

The root of this plant is accounted aperient, corroborant, and ſudorific; and even preferred by ſome to ſaſſafras in theſe intentions. The leaves, agitated with water, raiſe a ſaponaceous froth, which has nearly the ſame effects with ſolutions of ſoap itſelf, in taking out ſpots from cloths, whence the name.

SAPOTA, in botany, the ſame with the achras. See the article ACHRAS.

SAPPHIRE, a pellucid gem, which, in its fineſt ſtate, is extremely beautiful and valuable, and ſecond only to the diamond in luſtre, hardneſs, and price. Its proper colour is a pure blue; in the fineſt ſpecimens it is of the deepeſt azure, and in others varies into paleneſs in ſhades of all degrees between that and a pure cryſtal brightneſs and water, without the leaſt tinge of colour, but with a luſtre much ſuperior to the cryſtal. They are diſtinguiſhed into four ſorts, *viz.* the blue ſapphire, the white ſapphire, the water ſapphire, and the milk ſapphire.

The gem known to us by this name is extremely different from the ſapphire of the antients, which was only a ſemi-opake ſtone, of a deep blue, veined with white, and ſpotted with ſmall gold-coloured ſpangles, in the form of ſtars, and was only a more beautiful kind of the lapis lazuli: but our ſapphire they have deſcribed under the name of beryllus aeroides, or the ſky-blue beryl.

The fineſt ſapphires in the world are brought from the kingdom of Pegu, in the Eaſt-indies, where ſome are found perfectly colourleſs, and others of all the ſhades of blue; theſe are all found in the pebble-form. We have very fine ſapphires alſo, partly pebble, partly cryſtal-ſhaped, from Biſnagar, Conanor, Calicut, and the iſland of Ceylon: theſe alſo are of all the ſhades of blue. And in Ceylon there are ſometimes found a ſort of baſtard gems, of a mixed nature between the ſapphire and ruby. The occidental are from Sileſia, Bohemia, and many other parts of Europe; but though theſe are often very beautiful ſtones, they are greatly inferior, both in luſtre and hardneſs, to the oriental.

The ſapphire is ſaid to have very great virtues as a cordial, ſudorific, and alexipharmic; but we have no good teſtimony of any body's having ever found this by experiment.

For the manner of making counterfeit ſapphires, ſee GEMS ARTIFICIAL.

SAPPHIRINE WATER, in the materia medica, alſo called blue eye-water, is thus prepared: pour a pint of lime-water, made ſtrong and freſh, into a copper-veſſel, add to it a dram of crude ſal armoniac, and throw in ſome filings or ſmall pieces of copper, and let it ſtand till it has acquired a beautiful colour.

This is uſed as an eye-water; as alſo to deterge old ulcers: and ſometimes it is mixed with other things in injections in gonorrhœas.

SAQUEM, a port-town, ſituated on the Red ſea, in the province of Abex, in Africa: eaſt long. 38° 30′, and north lat. 19°.

SAR, a river of Germany, which riſes in Alſace, and falls into the Moſelle, a little above Triers.

SARABAITES, a ſort of monks among the antient chriſtians, who did not reſort to the wilderneſs, as others did, but lived publicly in cities. Two or three of them uſually dwelt together, but they had no rule or government; they however obſerved very ſtrict faſts; wore looſe ſleeves, wide ſtockings, coarſe cloaths, frequently ſighed, and always bitterly inveighed againſt the clergy.

SARABAND, a muſical compoſition in triple time, the motions of which are ſlow and ſerious.

Saraband is alſo a dance to the ſame meaſure, which uſually terminates when the hand that beats riſes; by which it is diſtinguiſhed from a courant, which ends when the hand that beats the time falls; and is otherwiſe much the ſame as the minuet.

The ſaraband is ſaid to be originally derived from the Saracens, and is uſually danced to the ſound of the guitar or caſtanettes.

SARACENS, the inhabitants of Arabia; ſo called from the word *ſara*, which ſignifies a deſart, as the greateſt part of Arabia is: and this being the country of Mahomet, his diſciples were called Saracens.

SARAGOSSA, the capital of the province of Arragon in Spain: weſt lon. 1° 15′, and north lat. 41° 32′.

SARCASM, in rhetoric, a keen bitter expreſſion which has the true point of ſatyr, by which the orator ſcoffs and inſults his enemy;

enemy: ſuch was that of the Jews to our Saviour, He ſaved others, himſelf he cannot ſave.

SARCOCELE, in ſurgery, a ſpurious rupture, or hernia, wherein the teſticle is conſiderably tumified or indurated, like a ſcirrhus, or much enlarged by a fleſhy excreſcence, which is frequently attended with acute pains, and ſometimes ulceration, ſo as to degenerate at laſt into a cancerous diſpoſition. See HERNIA.

When the tumour of the teſticle is accompanied with hardneſs, the cauſes are much the ſame with thoſe of a ſcirrhus. When there is a fleſhy excreſcence, then the cauſe is uſually ſome contuſion or other external violence. The tumour differs as to its magnitude, being frequently no larger than a hen's egg, tho' ſometimes as big as a man's fiſt. The ſigns whereby the ſarcocele may be diſtinguiſhed from other ruptures are principally the hardneſs of the tumour, and its ſeat being in the teſticle; whereas the trne herniæ are diſtinct from the teſticle, and ſofter to the touch. If a ſarcocele be not timely brought to a ſuppuration, it very eaſily degenerates into a cancer; and if both teſticles are affected, caſtration is often neceſſary; but if the tumour proceeds through the inguen, up to the abdomen, even caſtration will be uſeleſs, and death is the conſequence.

A recent ſarcocele, according to Heiſter, may frequently be ſuppurated by digeſtive medicines, as well internal as external. When theſe medicines prove ineffectual, the ſize and pain of the tumour increaſe, and it ſeems inclined towards a cancerous diſpoſition, if it has not reached the ring of the abdominal muſcles, there is then but one way left of relieving the patient, and that is by a dextrous and timely extirpation of the diſordered teſticle, or both if they are affected, which is termed caſtration, and renders the patient impotent.

In this operation the ſpermatic veſſels are firſt to be tied ſecurely, with a ligature near the inguen, and afterwards divided, to give the patient leſs pain; and as a diviſion of theſe veſſels, which are ſo much enlarged, may be attended with a fatal hæmorrhage, it may be prudent, for the greater ſecurity, to paſs a double ligature round thoſe veſſels, one below the other; or elſe not to extirpate the teſticle ſo ſoon as it is freed from the ſcrotum, and its veſſels ſtrictly tied, but to wait a few days, till the teſticle begins to grow flaccid and mortifies, which is a ſign the ſpermatic veſſels are well ſecured, and may be divided without any danger; but if that does not follow, the ligature is not ſtrict enough, and another muſt be made, much tighter.

If a patient ſhould be troubled with a fleſhy excreſcence upon his teſticle, which is in other reſpects ſound, and finds no relief from medicines, the teſticle may be preſerved, and yet the patient freed from his diſorder, by opening the ſcrotum, and extirpating the offending part only.

With regard to the dreſſing, it is to be done with ſcraped lint and compreſſes, and ſecured by a proper bandage; and to abate the inflammation, which ſometimes ariſes, a diſcutient cataplaſm may be uſed, and the wound afterwards treated with ſome digeſtive ointment or vulnerary balſam. See WOUND.

SARCOCOLLA, in pharmacy, a gum-reſin, which approaches greatly to the nature of the ſimple gums. See the articles GUM and RESIN.

It is brought to us from Perſia and Arabia, in ſmall granules, moderately heavy, and of a whitiſh, browniſh, or reddiſh colour, very friable, of a faintiſh diſagreeable ſmell, and of an acrid and nauſeous taſte.

Hoffman abſolutely condemns the internal uſe of it. However it is recommended in ophthalmias, and defluxions of a ſharp matter upon the eyes; and is generally ordered to be diſſolved in milk for this purpoſe.

SARCOCOLLA is alſo a name given to the penæa. See the article PENÆA.

SARCOLOGY is that part of anatomy which treats of the ſoft parts, *viz.* the muſcles, inteſtines, arteries, veins, nerves, and fat. See MUSCLE, INTESTINES, *&c.*

SARCOMA, in ſurgery, denotes any fleſhy excreſcence. See EXCRESCENCE.

Sarcomata of the noſe, eyes, *&c.* may be ſometimes removed by cauſtics; but the extirpating them with the knife or ſciſſars is the ſafeſt and moſt eligible method. The wound ſhould be ſuffered to bleed a while, after which it may be waſhed with a collyrium made of aloes, tutty, and ſugar of lead, mixed in roſe-water.

SARCOPHAGOUS MEDICINES, in ſurgery, *&c.* are thoſe which eat away proud fleſh, and otherwiſe called cauſtics. See the article CAUSTICS.

SARCOTICS, in ſurgery, medicines which generate fleſh in wounds. See the articles WOUND and VULNERARIES.

SARCULATION,

SARCULATION, in the antient agriculture, a kind of hoeing, uſed to root up the weeds in their peas, *&c.*

SARDA, the PILCHARD, in ichthyology. See the article PILCHARD.

SARDA, the CARNELIAN, in natural hiſtory. See the article CARNELIAN.

SARDACHATES, a beautiful ſpecies of agat, of a cloudy and ſpotted fleſh colour. See the article AGAT.

SARDAM, a port-town of Holland, ſituated on the north ſide of the Wye, ſeven miles north-weſt of Amſterdam.

SARDINIA, an iſland of the Mediterranean, ſituated between 8° and 10° eaſt lon. and between 39° and 41° north lat. It is about one hundred and forty miles long, and ſixty broad; and gives the title of king to the duke of Savoy, under whoſe dominion it is.

SARDIS, the antient capital of Lydia, in Aſia, now in ruins.

SARDONYX, in natural hiſtory, a genus of ſemi-pellucid gems, of the onyx-ſtructure, zoned or tabulated, and compoſed of the matter of the onyx variegated with that of the red or yellow carnelian. See the articles CARNELIAN and ONYX.

Of this ſtone there are ſeveral beautiful ſpecies; as, 1. The thin zoned red ſardonyx; or whitiſh onyx with thin ſnow-white and red zones. 2. The broad zoned red ſardonyx; or horny onyx, with punctuated zones. 3. The horny onyx, with whitiſh and yellow zones; and is properly the yellow ſardonyx and the chryſolite onyx of the antients. 4. The orange-coloured ſardonyx; or bluiſh white onyx, with orange-coloured and whitiſh zones.

SARFE, in ichthyology, a ſpecies of cyprinus, with the iris of the eye and all the fins and tail red. See CYPRINUS.

This is a large ſpecies, and ſomewhat reſembles the roach, but it is narrower in proportion to its length, being, when full grown, ten inches long, and no more than three in breadth in the largeſt part.

SARGUS, in ichthyology, one of the ſpecies of ſparus, which have the teeth in the jaws broad. See the article SPARUS.

The ſargus is the yellow ſparus with a black annular mark at the tail.

SARK, a little iſland between Guernſey and Jerſey, ſubject to Great Britain.

SARPLAR *of wool*, the ſame with a pocket or half a ſack.

SARRACENA, in botany, a plant of the *polyandria-monogynia* claſs, with a rotaceous flower, conſiſting of five oval petals; the fruit is a roundiſh capſule, containing a great many roundiſh ſeeds.

SARRASIN, or SARRAZIN, in fortification, the ſame with herſe. See the article HERSE.

SARRITION, in the antient huſbandry, the ſame with what we call hoeing. See the article HOEING.

SARSAPARILLA, in pharmacy, the root of the rough ſmilax of Peru, conſiſting of a great number of long ſtrings hanging from one head: theſe long roots, the only parts made uſe of, are about the thickneſs of a gooſe-quill, or thicker, flexible, and compoſed of fibres running their whole length: they have a bitteriſh but not ungrateful taſte, and no ſmell: and as to their medicinal virtues, they are ſudorific and attenuant, and ſhould be given in decoction, or by way of diet-drink.

SARSINA, a town of Romania, in Italy, twenty-three miles ſouth of Ravenna.

SARTORIUS, in anatomy, is both an abductor and elevator, ſerving to move the legs upwards and forwards, determining them to croſs each other, as taylors ſit with them, whence the name; it riſes from the internal part of the anterior and ſuperior ſpine of the ileum; and deſcending obliquely, is inſerted into the upper and inner part of the tibia.

SARUM, or OLD SARUM, a borough-town of Wiltſhire, ſituated a little north of Saliſbury.

It ſends two members to parliament.

SASSAFRAS, in pharmacy, the wood of an american tree, of the laurel-kind, imported in large ſtraight blocks: it is ſaid to be warm, aperient, and corroborant; and frequently employed, with good ſucceſs, for purifying and ſweetening the blood and juices; for which purpoſe an infuſion, in the way of tea, is a very pleaſant drink: its oil is very fragrant, and poſſeſſes moſt of the virtues of the wood.

It is an excellent diuretic and diaphoretic, and therefore good in obſtructions of the viſcera, cachexies, ſcorbutic complaints, and in the venereal diſeaſe.

SASSARI, a town of Sardinia, ſixty-five miles north of Oriſtagni.

SAS VAN GHENT, a town of dutch Flanders, twelve miles north of Ghent.

SATELLITE, in aſtronomy, the ſame with a ſecondary planet, or moon; ſo called from its continually waiting upon or revolving round one of the primary planets. See the article PLANET.

Thus

Thus the moon may be called the ſatellite of the earth: but the term is chiefly applied to the new-diſcovered planets, which make their revolution about ſaturn and jupiter. See the articles MOON, JUPITER, and SATURN.

SATIR, SATIRE, or SATYR. See SATYR.

SATISFACTION, in law, is the giving a recompence for ſome injury done; or the payment of money due on bond, judgment, &c.

SATRAPA, or SATRAPES, in perſian antiquity, denotes an admiral; but more commonly the governor of a province.

SATTIN, a gloſſy kind of ſilk-ſtuff, the warp of which is very fine, and ſtands out ſo as to cover the coarſer woof.

Some ſattins are quite plain, others wrought; ſome flowered with gold or ſilver, and others ſtriped, &c.

The chineſe ſattins are moſt valued, becauſe of their cleaning and bleaching eaſily, without loſing any thing of their luſtre: in other reſpects they are inferior to thoſe of Europe.

SATTINET, a ſlight thin kind of ſattin, commonly ſtriped, and chiefly uſed by the ladies for ſummer night-gowns.

SATURANTS, in pharmacy, the ſame with abſorbents. See ABSORBENTS.

SATURATION, in chemiſtry, is the impregnating an acid with an alkali, or *vice verſa*, till either will receive no more, and the mixture become neutral.

SATURDAY, the ſeventh or laſt day of the week, ſo called from the idol Seater, worſhiped on this day by the antient Saxons, and thought to be the ſame as the Saturn of the Latins. Saturday anſwers to the jewiſh ſabbath. See SABBATH.

SATUREIA, SAVORY, in botany, a genus of the *didynamia-angioſpermia* claſs of plants, with a monopetalous ringent flower, and no pericarpium; the ſeeds, which are four and roundiſh, being contained in the bottom of the cup.

The leaves of ſummer-ſavory are very pungent, warm, and aromatic; and afford, in diſtillation with water, a ſubtile eſſential oil. Both are eſteemed good in crudities of the ſtomach, aſthmas, and menſtrual obſtructions.

SATURN, ♄, in aſtronomy, the remoteſt of the ſuperior planets, which, by reaſon of its great diſtance from the ſun, ſhines but with a feeble light. See PLANET.

Though Galileo's teleſcope was ſufficient to diſcover all jupiter's moons, it could not reach ſaturn's, on account of their great diſtance; but yet this ſagacious obſerver found ſaturn, by reaſon of his ring, had a very odd appearance; for his glaſs was not good enough to exhibit the true ſhape of the ring, but only a confuſed idea of that and ſaturn together, which, in the year 1610, he advertiſed in the letters of this ſentence tranſpoſed: "Altiſſimum planetam tergeminum obſervavi;" *i. e.* I have obſerved ſaturn to have three bodies.

This odd phænomenon perplexed the aſtronomers very much, and various hypotheſes were formed to ſolve it; all which appeared trifling to the happy Huygenius, who applied himſelf purpoſely to improve the grinding of glaſſes, and perfecting long teleſcopes, to arrive at a more accurate notion of this planet and its appendage. Accordingly, in 1655, he conſtructed a teleſcope of twelve feet; and viewing ſaturn divers times, he diſcovered ſomething like a ring encompaſſing his body; which afterwards, with a tube of twenty-three feet, he obſerved more diſtinctly, and alſo diſcovered a ſatellite revolving about the planet. This huygenian ſatellite is the fourth in order from ſaturn. See plate CCXXXVI. fig. 5.

In the year 1659, Huygens publiſhed his diſcovery in relation to ſaturn's ring, in the letters of this ſentence tranſpoſed: "Annulo cingitur tenui plano, nuſquam cohærente, ad eclipticam inclinato;" *i. e.* ſaturn is encompaſſed by a thin plane ring, no where cohering to his body, and inclined to the plane of the ecliptic. This inclination of the ring to the ecliptic is determined to be about 31 degrees by Huygens, Romer, Pickard, Campani, &c. tho' by a method not very definitive. However, ſince the plane of the ring is inclined to the plane of the earth's motion, it is evident, when ſaturn is ſo ſituated that the plane of his ring paſſeth through the earth, we can then ſee nothing of it; nor can we ſee it when the plane paſſes between the ſun and the earth, the dark ſide being then turned to us, and only a dark liſt appearing upon the planet, which is probably the ſhadow of the ring. In other ſituations the ring will appear elliptical, more or leſs; when it is moſt ſo, the heavens appear through the ecliptic ſpace on each ſide ſaturn (which are called the anſæ), and a fixed ſtar was once obſerved by Dr. Clarke's father in one of them.

The nodes of the ring are in 19° 45′ of virgo and piſces. During ſaturn's heliocentric motion from 19° 45′ to the oppoſite

oppoſite node, the ſun enlightens the northern plane of the ring.

Since ſaturn deſcribes about one degree in a month, the ring will be viſible thro' a good teleſcope till within about fifteen or twenty days before and after the planet is in 19° 45′ of virgo or piſces. The time therefore may be found by an ephemeris, in which ſaturn, ſeen from the earth, ſhall be in thoſe points of the ecliptic; and likewiſe when he will be ſeen from the earth in 19° 45′ of gemini and ſagittarius, when the ring will be moſt open, and in the beſt poſition to be viewed.

There have been ſome grounds to conjecture that ſaturn's ring turns round an axis; but that is not yet demonſtrable. This wonderful ring, in ſome ſituations, does alſo appear double; for Caſſini, in 1675, obſerved it to be diſſected quite round by a dark elliptical line, dividing it, as it were, in two rings, of which the inner one appeared brighter than the other. This was oftentimes obſerved afterwards, with tubes of thirty-four and twenty feet, and more evidently in the twilight or moon-light, than in a darker ſky. This ring is the moſt remarkable thing in the whole planetary ſyſtem, there being nothing of that nature hitherto diſcovered in any of the other planets. Kepler, in his Epitom. Aſtron. Copernic. and after him Dr. Halley, in his enquiry into the cauſes of variation of the needle, Philoſ. Tranſact. n° 195, ſuppoſe our earth may be compoſed of ſeveral cruſts or ſhells, one within another, and concentric to each other. And if ſo, then it is poſſible the ring of ſaturn may be the fragment or remaining ruins of his formerly exterior ſhell, the reſt of which is broken or fallen down upon the body of the planet. And if ſaturn ever had ſuch a ſhell round it, its diameter would then have appeared as big to an eye at the ſun, as that of jupiter doth now, when ſeen from thence.

Since the outward margin of the ring is diſtant from ſaturn $2\frac{1}{4}$ of ſaturn's ſemidiameter, this cannot be ſeen at the diſtance of 64 degrees from ſaturn's equator, in whoſe plane the ring is placed. Therefore, a ſpectator, placed in a latitude higher than that, can never ſee the ring at all; ſo that there is a zone of almoſt 53 degrees broad towards either pole, to whom this famous ring can never appear. And as the ſpectator ſhall move nearer the pole, firſt one, then the ſecond ſatellite, next the third and fourth, and, when he is come within one degree of the pole, even the fifth ſatellite cannot be ſeen, unleſs by refraction; and, in the winter-time, neither ſun, moon, nor any planet will be there viſible, unleſs perhaps a comet.

If the eye be ſuppoſed to be placed in the equator of ſaturn, or in the zone nearly adjoining, it can never ſee thoſe ſtars that are in or very near the equator, nor any one of the ſatellites; becauſe the ring will always hide them; and then at the equinoxes it cannot ſee the ſun; and if it were any where elſe placed, it could not then ſee the ring; becauſe neither of its faces will then appear illuminated by the ſun. The breadth of this ring it is hard to determine from our earth, becauſe its thickneſs is ſo ſmall; but Mr. Huygens makes it to be about 600 german miles.

For one half of ſaturn's years (*viz.* fifteen of ours) only one face of the ring will be enlightened by the ſun; whence the inhabitants, which may be ſuppoſed to live in that hemiſphere, to which this face of the ring is turned, or to whom it is ſummer, will ſee that part of the ring which is above their horizon, ſhining faintly by day, as our moon doth when the ſun is above our horizon, but brighter and ſtronger by night, as our moon doth in the ſun's abſence: and, after ſun-ſet, the eaſtern part of this enlightened arch will fall within the ſhadow of ſaturn; which ſhade will aſcend, as night comes on, and at night will be at the higheſt; and then will deſcend again towards the weſtern part of the ring, according as the ſun comes more and more to the eaſtward.

This enlightened arch will always ſhew how to deſcribe a meridian line; for a plane perpendicular to the horizon, and paſſing through the vertex of the arch, will be in the true meridian.

To an eye placed any where without, and at leſs than fifty degrees diſtant from the equator, this enlightened arch of the ring will appear concave as well as convex, like a kind of furnace or vault, riſing above the horizon: but to an eye more than 52 minutes, and leſs than 64 degrees, diſtant from the equator, the hollow or concave part will not be viſible; but there will appear a brightiſh body ariſing, as it were, out of the ground, and contiguous to the horizon.

For the other half of ſaturn's year, while the ſun declines towards the depreſſed pole, or during the fifteen years winter, the

the ring will not be viſible, as having not that face illuminated which is turned to the ſpectator's eye; but, however, will render itſelf ſenſible, by covering from the ſight ſuch ſtars and parts of the heavens as are oppoſite to it, or apparently behind it. The ſhade of the ring alſo will be extended more and more towards the nearer pole; ſo that to an eye placed any where within the aforeſaid ſpace, the ſun, when he attains ſuch a certain declination, will appear to be covered or eclipſed juſt at noon, and then ſtraight to emerge out of the ſhadow. The next day, the like phænomenon will happen, but the eclipſe will begin ſooner, and will be over later: and theſe meridian eclipſes will daily increaſe in their duration until the middle of winter; and then they will decreaſe again gradually, till at laſt they will come to nothing again, *viz.* when the ſun, returning from the tropic, hath the ſame declination as he had when theſe meridional eclipſes began.

And this will happen, if an eye be placed in any latitude greater than 25 or 26 degrees; but if in a latitude leſs than this, when the meridional darkneſs is of the greateſt duration, the ſun will ſuddenly appear juſt in the meridian, and then ſtraightway will be eclipſed again. The next day there will appear the like ſort of light, but it will laſt longer; and this meridian light will grow ſtill longer and longer in duration, till mid-winter, and then, like the darkneſs above-mentioned, it will be continually decreaſing, until it quite diſappear.

And from hence it is plain, that there is the greateſt difference between ſummer and winter in the globe of ſaturn, of all the other planets; and this both on the account of the long duration of each, and the great declination of the ſun from the equator; and alſo by reaſon of theſe meridional darkneſſes of the winter, ariſing from the ring's eclipſing the ſun.

If an eye were placed in ſaturn, the diameter of the ſun would appear almoſt ten times leſs than it doth to us; and conſequently his diſc, light, and heat will be there ninety times leſs. Saturn's year is almoſt thirty of ours; but the length of his day is yet uncertain, becauſe the time of his revolution round his axis is not yet known; but Mr. Huygens judges they are longer than the days of jupiter. That great aſtronomer ſuppoſeth the axis of ſaturn to be perpendicular to the plane of his ring, and of the orbits of the ſatellites: if ſo, then there will be the ſame poſition of the equator and poles, as to the fixed ſtars, as there is in our earth; the ſame pole-ſtar and the fixed ſtars will appear to riſe and ſet after the ſame manner, in the ſame latitudes. There is a vaſt inequality, in the length of the day, in ſeveral parts of this planet; and as great a diverſity of ſummer and winter; which depends on the quantity of the inclination of the plane of the equator to the plane of the orbit of ſaturn round the ſun, which Huygens makes to be 51 degrees, which is almoſt one third more than our earth, where yet the differences and variety of ſeaſons and weather are very ſenſible. For in ſaturn, in the latitude of 50 degrees, the longeſt day will have no night at all, and the longeſt night will have no day. And the two frigid zones will be each of them 62 degrees broad, at leaſt ten times as large as the whole ſurface of our earth. The eye thus placed will be able to diſcern none of the planets but jupiter, which will appear always to accompany the ſun, and never to be from him above 37 degrees. The parallax of the ſun in ſaturn is but nine ſeconds, and therefore inſenſible; but the parallaxes of all his moons or ſatellites are very conſiderable, and therefore their diſtances from him will be eaſily computable.

For the other particulars relating to the aſtronomy of ſaturn, ſee the articles PLANET, COPERNICAN, DIAMETER, DISTANCE, INCLINATION, PERIOD, *&c.*

Satellites of SATURN, are five moons; the firſt or inmoſt of which revolves about ſaturn in 1 day, 21 hours, and 18 minutes, at the diſtance of near two ſemi-diameters of the ring; the ſecond, in 2 days, 17 hours, and 41 minutes, at the diſtance of $2\frac{2}{5}$ ſemi-diameters; the third, in 4 days, 12 hours, and 25 minutes, at the diſtance of $3\frac{3}{5}$ ſemi-diameters; the fourth, in 15 days, 22 hours, and 41 minutes, at the diſtance of 8 ſemi-diameters; and the fifth, in 70 days, 22 hours, and 4 minutes, at the diſtance of $23\frac{3}{10}$ ſemi-diameters of ſaturn's ring.

In the beginning of the year 1665, the celebrated Mr. Huygens, as already obſerved, diſcovered the biggeſt of ſaturn's ſatellites; the other four ſatellites of ſaturn were all the diſcovery of Mr.

Caſſini, the third and fifth in the years 1671, 1672, and 1673; but the firſt and ſecond were not diſcovered till the year 1684, by extraordinary teleſcopes of eighty, one hundred, one hundred and fifty, and two hundred feet in length.

SATURN, in chemiſtry, *&c.* an appellation given to lead. See LEAD.

SATURN, in heraldry, denotes the black colour, in blazoning the arms of ſovereign princes. See the articles SABLE, COLOUR, and BLAZONING.

SATURNALIA, in roman antiquity, a feſtival obſerved about the middle of December, in honour of the god Saturn, whom Lucan introduces, giving an account of the ceremonies obſerved on this occaſion thus: "During my whole reign, which laſts but for one week, no public buſineſs is done; there is nothing but drinking, ſinging, playing, creating imaginary kings, placing ſervants with their maſters at table, *&c.* There ſhall be no diſputes, reproaches, *&c.* but the rich and poor, maſters and ſlaves, ſhall be equal," *&c.*

On this feſtival the Romans ſacrificed bare-headed, contrary to their cuſtom at other ſacrifices.

SATURNINE, an appellation given to perſons of a melancholy diſpoſition, as being ſuppoſed under the influence of the planet ſaturn. See MELANCHOLY.

SATYR, in the heathen mythology, a fabulous kind of demi-god, or rural deity, of the antient Romans, repreſented with goat's feet, and ſharp pricked up ears.

Some think the notion of theſe ſatyrs might have been derived from the monkeys known at preſent under the ſame name. See the article MONKEY.

SATYR, or SATIRE, in matters of literature, a diſcourſe or poem, expoſing the vices and follies of mankind.

The ſatyr of the Greeks differed from that of the Romans, as being a kind of interlude annexed to tragedy, with a view to remove from the audience too melancholy impreſſions. But ſatyr, as we now have it, is entirely roman, if we may believe Quintilian, who ſays, "*Satira quidem tota noſtra eſt*;" or Horace, who ſtyles Ennius the inventor of a poem, unknown to the Grecians, meaning ſatyr, according to the opinion of all his interpreters. Scaliger however expreſly denies it to be of roman original; and there is reaſon, indeed, as we ſhall ſee hereafter, to underſtand theſe expreſſions of Quintilian and Horace with ſome abatement. Thoſe that will not allow it to be derived from the Grecians, but entirely roman, maintain that ſatyr ſhould be writ with an *i*, not a *y*; and that it is not derived from *ſatyrus*, but *ſatur*; *ſatira* therefore is the ſame as *ſatura*, as *maximus* antiently *maxumus*.

When the Romans grew more polite, theſe kind of verſes refined in proportion, but they retained ſtill their jibes and banters, and kept ſo far to their firſt inſtitution, as to make the follies of human life the object of their ridicule. From hence proceeded ſatyr, ſo called from the farrago and variety of matter it contained. It was improved likewiſe with muſic and dancing, which, conſidering its being carried on in dialogue, made it reſemble ſomewhat of the dramatic kind; nor had the Romans any thing that came ſo near the drama as this did. Afterwards, when they had received both tragedy and comedy from the Grecians, they were ſo taken with the novelty, that ſatyr for ſome time lay neglected: but coming again into eſteem, it was added as a kind of exodium to comedy. Thus things went on for ſome years till Ennius aroſe, endued with wit and true poetic fire, who obſerving how fond the people were of ſeeing the vices of mankind expoſed upon the ſtage, thought a poem on the ſaid ſubject, without the decoration of ſcenes and action, might have the ſame effect. Accordingly he attempted ſatyrs in the ſame form we now ſee them, only he did not confine himſelf to the hexameter, but made uſe of all ſorts of meaſure. The remains we have of this poet are noble indications of the ſtrength of his genius; and Horace and Virgil have ſhewn what opinion they had of his writings, by borrowing ſo much from them. After Ennius ſucceeded Pacuvius; but his works are all loſt, excepting ſome fragments, and thoſe of uncertain authority. Next came Lucilius, of whom alſo we have ſome fragments remaining: but his excellencies and imperfections are very amply ſet forth by Horace, whoſe words we have no occaſion to cite here.

It muſt be allowed however, that one ſpecies of ſatyr owes its perfection to Horace, as another does to Juvenal. A third kind was the varronian or menippean ſatyr, ſo called from Menippus, a cynic philoſopher among the Grecians, whoſe doctrine Varro followed. It was a ſort of medley, conſiſting of not only all kinds of verſe, but of verſe and proſe

mixed

mixed together; a ſpecimen of which we have in Petronius's Satyricon. We have none of Varro's poetical works remaining, except ſome ſmall fragments; which is the more to be lamented, conſidering the character Quintilian gives of him, that he was the moſt learned of all the Romans.

The word ſatyr was antiently taken in a leſs reſtrained ſenſe than it is at preſent, not only as denoting a ſevere poem againſt vice, but as conſiſting of precepts of virtue, and the praiſes of it: and even in the ſatyrs, as they are called, of Horace, Juvenal, and Perſius, *&c.* which are principally levelled againſt the weakneſs, the follies, or vices of mankind, we find many directions, as well as incitements, to virtue. Such ſtrokes of morality Horace is full of; and in Juvenal they occur very frequently. All of them, ſometimes, correct vice like moraliſts; we may ſay, like divines rather than ſatyriſts.

With reſpect to the nature and different ſpecies of it, ſatyr, in general, being a poem deſigned to reprove the follies and vices of mankind, is twofold; either the jocoſe, as that of Horace; or the ſerious, like that of Juvenal: the former hidden, the latter open: that generally makes ſport with vice, and expoſes it to ridicule; this probes it to the bottom, and puts it to the torture: and ſo far is it from not deſerving the title of ſatyr, as ſome pretend, that it ſeems rather a more noble ſpecies of it; and the genteel ſtrokes of Horace, how ingenious ſoever, are leſs affecting than the poetic rage and commendable zeal of Juvenal.

They both agree in being pungent and cutting, yet are diſtinguiſhed by very evident marks. The one is pleaſant and facetious, the other angry and auſtere: the one ſmiles; the other ſtorms: the foibles of mankind are the object of one; greater crimes of the other: the former is always in the pleaſing ſtyle; the latter generally in the ſublime: that abounds with wit only; this adds to the ſalt bitterneſs and acrimony. Either kind of ſatyr may be writ in the dialogue or epiſtolary manner; and we have inſtances of both forms in Horace, Juvenal, and Perſius. As ſome of Horace's, which are called Satyrs, are as truly epiſtles; ſo many of his epiſtles might as well be called ſatyrs: for example, *Qui fit Mecænas, &c.* might, with equal reaſon, be reckoned among the epiſtles; and *Prima dicta mihi, &c.* among the diſcourſes or ſatyrs; if the author or editor had ſo thought fit.

The chief ſatyriſts among the antients are Horace, Juvenal, and Perſius; thoſe among the moderns, Regnier, and Boileau, in French; and Dryden, Oldham, Rocheſter, Buckingham, Pope, Young, *&c.* among the Engliſh.

SATYRIUM, GOAT'S-STONES, a genus of the *gynandria-diandria* claſs of plants, the flower of which conſiſts of five ovato-oblong petals; and its fruit is an oblong, unilocular capſule, containing a great many ſcobiform and very ſmall ſeeds.

The root of this plant is compoſed of two oval bulbs, of a whitiſh colour, a ſweetiſh taſte, and a faint unpleaſant ſmell: it abounds with a glutinous ſlimy juice; and, like other mucilaginous vegetables, it ſerves to thicken the thin ſerous humours, and defend the ſolids from their acrimony: it has alſo been celebrated, though on no very good foundation, for analeptic and aphrodiſiac virtues; in which intentions it has alſo been frequently uſed.

SAVANNA, a town and river of Georgia, in north-America: weſt long. 81° 20′, north lat. 32°

SAVANT, or SCAVANT. See the article SCAVANT.

SAUCISSE, or SAUSAGE, in the military art, a long train of powder, ſewed up in a roll of pitched cloth, about two inches in diameter, ſerving to ſet fire to mines. See the article MINE.

There are uſually two ſauciſſes extended from the chamber of the mine to the place where the engineer ſtands; that in caſe one ſhould fail, the other may take effect.

SAUCISSON, in fortification, a maſs of large branches of trees bound together; and differing only from a faſcine, as this is compoſed of ſmall branches of twigs. See the article FASCINE.

Sauciſſons are employed to cover the men, and to make epaulements.

SAVE, a large river of Germany, which riſing in Carinthia, runs eaſt through Carniola and Croatia, and dividing Sclavonia from Turky, diſcharges itſelf into the Danube at Belgrade.

SAVIGLIANO, a town of Piedmont, twenty-one miles ſouth of Turin.

SAVIN, *ſabina*, in botany, is only a ſpecies of juniper. See JUNIPER.

Savin is famous as an hyſteric and attenuant: and, indeed, it promotes the diſcharges by urine, and the menſes, more forcibly than ſafely, if not under very careful management.

SAVIOUR, an appellation peculiarly given to Jeſus Chriſt, as being the true Meſſiah, and Saviour of the world. See MESSIAH.

Order of St. SAVIOUR, a religious order in the romiſh church, founded by St. Bridget, about the 1345; and ſo called from its being pretended that our Saviour himſelf dictated to the foundreſs its conſtitutions and rules.

According to the conſtitutions, this order is principally founded for religious women who pay a particular honour to the holy virgin: but there are ſome monks of the order, to adminiſter the ſacraments, and ſpiritual aſſiſtance to the nuns. The number of nuns is fixed at ſixty in each monaſtery; and that of the religious prieſts at thirteen, according to the number of the apoſtles, of whom St. Paul was the thirteenth. There are alſo four deacons, repreſenting the four doctors of the church, St. Ambroſe, St. Auguſtin, St. Gregory, and St. Jerom; and eight lay-brothers; who altogether make up the number of the thirteen apoſtles, and the ſeventy-two diſciples of Jeſus Chriſt. The nuns are not admitted till eighteen years of age, nor the friars before twenty-five; and they are to perform a year's novitiate.

SAUMUR, a city of France, in the province of Orleanois, and dutchy of Anjou; twenty-four miles eaſt of Anjou.

SAUNDERS, the ſame with ſantalum. See the article SANTALUM.

SAVOLAXIA, a ſubdiviſion of Finland, in Ruſſia, ſituated between Cajania, Kexholm, Carelia, and Bothnia.

SAVONA, a city and port-town of the territory of Genoa, ſituated twenty-ſix miles ſouth-weſt of the city of Genoa.

SAVORY, *ſatureia*, in botany, *&c.* See SATUREIA.

SAVOUR, or TASTE. See TASTE.

SAVOY, a dutchy, ſituated between France and Italy, on the weſt ſide of the Alps; bounded by the lake and territory of Geneva, on the north; by Switzerland and Piedmont, on the eaſt; by another part of Piedmont and Dauphine, on the South; and by Franche Compte and Dauphine, on the weſt.

SAURURUS, in botany, a plant of the *hexandria trigynia* claſs, without any flower petals: its fruit is an oval unilocular berry, containing only a ſingle oval ſeed.

SAUSAGE, or SAUCIDGE, a popular food, prepared of ſome crude meat, uſually either pork or veal chopped ſmall, ſeaſoned, and put up in a ſkin or gut in the manner of a black-pudding.

The moſt eſteemed confection of this kind is the bologna ſauſage, which is much thicker than the common ſort, and is made of freſh pork well beaten in a mortar, with a quantity of garlic, pepper in the grain, and other ſpices. Theſe ſauſages are made with moſt ſucceſs in ſome cities of Italy, particularly in Bologna, Venice, *&c.* whence great quantities are exported to other places: the Italians are furniſhed with great part of their ſkins or guts for theſe ſauſages from England.

Bologna ſauſages, on being imported into England, pay a duty of $2\frac{87\frac{1}{4}}{100}$d. the pound; and draw back, on exportation, $2\frac{58\frac{3}{4}}{100}$d.

SAUSAGE, in war, the ſame with ſauciſſe. See the article SAUCISSE.

SAUT, in the manege. See SALTS.

SAUVAGEA, in botany, a genus of the *polyandria-monogynia* claſs of plants, the corolla whereof conſiſts of five obtuſe equal petals, ſhorter than the leaves of the cup: the fruit is an oval acuminated capſule, covered by the cup containing one cell, and in it a number of ſeeds.

SAW, an inſtrument which ſerves to cut into pieces ſeveral ſolid matters; as wood, ſtone, ivory, *&c.*

The beſt ſaws are of tempered ſteel ground bright and ſmooth: thoſe of iron are only hammer-hardened: hence, the firſt, beſides their being ſtiffer, are likewiſe found ſmoother than the laſt. They are known to be well hammered by the ſtiff bending of the blade; and to be well and evenly ground, by their bending equally in a bow.

The edge in which are the teeth is always thicker than the back, becauſe the back is to follow the edge. The teeth are cut and ſharpened with a triangular file, the blade of the ſaw being firſt fixed in a whetting-block. After they have been filed the teeth are ſet, that is,

turned

# of a SAWING-MILL.

Fig. 1.

A Section & Plan

Fig. 2.

T. Jefferys sculp.

turned out of the right line, that they may make the kerf or fiſſure the wider, that the back may follow the better. The teeth are always ſet ranker for coarſe cheap ſtuff than for hard and fine, becauſe the ranker the teeth are ſet the more ſtuff is loſt in the kerf. The ſaws by which marble and other ſtones are cut have no teeth: theſe are generally very large, and are ſtretched out and held even by a frame.

The workmen who make the greateſt uſe of the ſaw, are the ſawyers, carpenters, joiners, cabinet-makers, eboniſts, ſtone-cutters, carvers, ſculptors, *&c.* The lapidaries too have their ſaw, as well as the workers in moſaic; but theſe bear little reſemblance to the common-ſaw. But of all mechanics, none have ſo many ſaws as the joiners; the chief are as follows: the pit-ſaw, which is a large two handed ſaw, uſed to ſaw timber in pits; this is chiefly uſed by the ſawyers. The whip-ſaw, which is alſo two handed, uſed in ſawing ſuch large pieces of ſtuff as the hand-ſaw will not eaſily reach. The hand-ſaw, which is made for a ſingle man's uſe, of which there are various kinds; as the bow or frame-ſaw, which is furniſhed with cheeks: by the twiſted cords which paſs from the upper parts of theſe cheeks, and the tongue in the middle of them, the upper ends are drawn cloſer together, and the lower ſet further apart. The tenon-ſaw, which being very thin, has a back to keep it from bending. The compaſs-ſaw, which is very ſmall, and its teeth uſually not ſet: its uſe is to cut a round, or any other compaſs-kerf: hence the edge is made broad and the back thin, that it may have a compaſs to turn in. See moſt of theſe ſaws repreſented in the plate of JOINERY.

The ſurgeons alſo uſe a ſaw to cut off bones; this ſhould be very ſmall and light, in order to be managed with the greater eaſe and freedom, the blade exceeding fine, and the teeth exquiſitely ſharpened, to make its way more gently, and yet with great expedition, in cutting off legs, arms, *&c.* See plate CCXXXVI. fig. 7.

Saws, on being imported, pay the following duties, *viz.* whip-ſaws, each $11\frac{5}{100}$d. draw back, on exportation, $10\frac{12\frac{1}{2}}{100}$d. Hand-ſaws, the dozen, 1s. $3\frac{40}{100}$d. draw back, on exportation, 1s. $2\frac{1}{2}$d. Tenon-ſaws, the dozen, 2s. $6\frac{80}{100}$d. draw back, on exportation, 2s. 3d. beſides the uſual duties on iron.

SAW-FISH, *ſerea piſcis*, or *priſtis*, in ichthyology, a ſpecies of ſqualus, with the roſtrum very long, flat, and dentated on both ſides. It is one of the moſt ſingular animals of the fiſh-kind, and grows to a conſiderable ſize, being often more than twelve feet in length, including the roſtrum, and very thick in proportion: the head is large, and terminates in a bony roſtrum, three or four feet, or more, in length, and furniſhed all along, on both ſides, with very long, robuſt, and ſharp teeth, or denticulations. See plate CCXXXVI. fig. 8.

SAWING, dividing timber, *&c.* by the application of a ſaw, either by the hand or mill.

The mechaniſm of a ſawing-mill may be reduced to three principal things, the firſt, that the ſaw be drawn up and down as long as is neceſſary, by a motion communicated by water to the wheel: the ſecond, that the piece of timber to be cut into boards be advanced by an uniform motion to receive the ſtrokes of the ſaw; for here the wood is to meet the ſaw, and not the ſaw to follow the wood, therefore the motion of the wood and that of the ſaw ought immediately to depend the one on the other: the third, that when the ſaw has cut through the whole length of the piece, the whole machine ſtops of itſelf and remains immoveable; for fear, leſt having no obſtacle to ſurmount, the force of the water ſhould turn the wheel with too great rapidity, and break ſome part of the machine. In plate CCXXXVII. and CCXXXVIII. we have given ſeveral views of this mill: plate CCXXXVII. fig. 1. repreſents a ſection of it taken lengthwiſe from A to B. Fig. 2. *ibid.* is a plan of the mill on a level with the ground: AB being the floor, and *ff*, *gg*, two grooves for receiving the ſhafts of the chariot, which carries the piece to be ſawed; by which means the piece not only advances with the chariot, but is alſo kept ſteady, ſo that the ſtrokes of the ſaw work always on the ſame line.

Fig. 1. plate CCXXXVIII. repreſents the breadth of the mill: and fig. 2. *ibid.* the plan of the cave of the mill. In each of theſe figures the ſame letters expreſs the ſame parts, only repreſented in a different view: thus MN, in fig. 1. and 2. *ibid.* repreſent the great wheel turned by a fall of the water, which has five feet and a quarter

quarter of radius, and its arbor is ſixteen inches. O, in each of the figures, is the cog-wheel turning on the ſame arbor with the great wheel, and inſerting its teeth into the ſpindles of the trundle-head P; and, on the other, into thoſe of the trundle-head R: in the trundle-head P there is a broad handle faſtened to the iron-blade Y, (plate CCXXXVII. fig. 1. which, as the trundle-head moves round, goes up and down, and gives the ſame motion to the ſaw T: this handle is ſeen in its true form at Q, (plate CCXXXVIII. fig. 1. and 2.). The other trundle-head, R, which turns with its axle-tree, or roller, S, (*ibid.* fig. 2.) winds up a rope, which brings towards the ſaw, the chariot *r*, (plate CCXXXVII. fig. 1.) on which the piece of wood to be ſawed is placed. When the wood is arrived cloſe to the ſaw the rope is no longer of uſe; there being then another moderator which regulates the motion of the piece in proportion as it is ſawed. Z, (pl. CCXXXVIII. fig. 1. is a cramp-wheel, containing three hundred and eighty-four hooked teeth, the axis of which wheel drives two ſmall trundle-heads, which are inſerted into teeth which line the undermoſt part of the ſhafts of the chariot; by which means, if the cramp-wheel advances, the chariot muſt alſo advance, and the piece of timber with it.

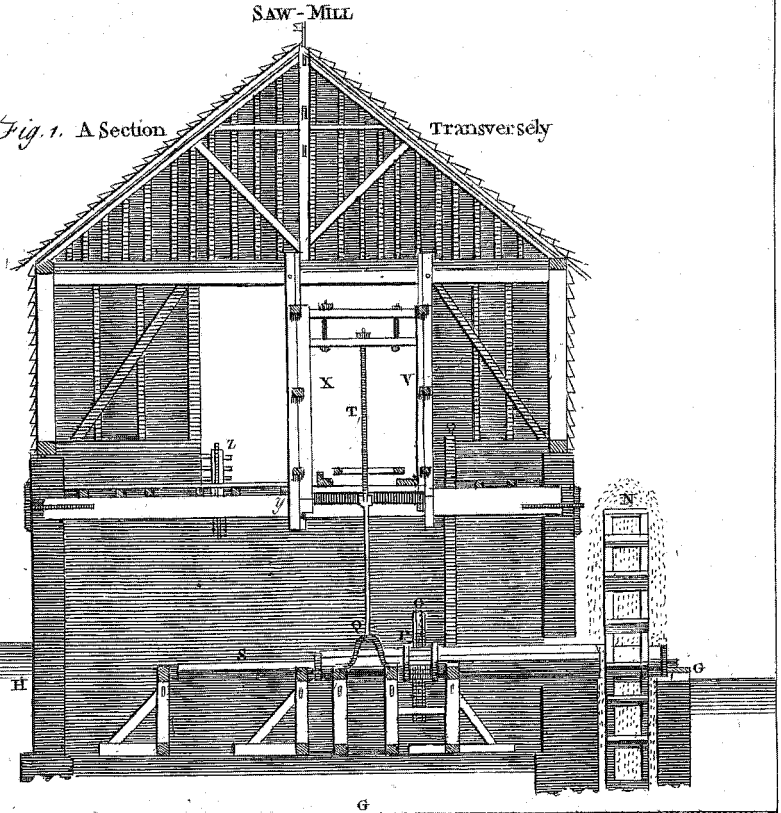
Upon the upper part of the entortiſe of the ſaw, (pl. CCXXXVII. fig. 1.) there is an iron-rod, *b*, faſtened to it, on the one end with a hinge, and on the ſide to a moving lever, *d*, which goes up and down with it; this lever is faſtened by a hinge at *a*: from the end of this lever there deſcends a wooden ſhaft, which carries at its extremity an iron in the form of a hind's foot, which enters the teeth of the cramp-wheel. In order to underſtand the uſe of all theſe parts, let it be obſerved, that after the rope, by being wound on the axis of the trundle-head R, has brought the chariot and piece of wood as far as the ſaw, the trundle-head P is let looſe to the cog-wheel, which makes the handle Q, and conſequently the ſaw, go up; which aſcending lifts up the lever *d*, which drawing the hinge at *a* the handle protracts itſelf, and drives farther a notch of the cramp-wheel Z: this cramp-wheel, in turning with its axis, drives round the trundle-heads, which inſerting their ſpindle into the teeth at the bottom of the chariot, carry off ſome of them, and make the piece of timber come a little forwards. This is all performed while the ſaw aſcends: and as it is larger at the top than at the bottom, it leaves at that inſtant an empty ſpace between itſelf and the piece of wood it has bit. The wood advances without any obſtacle, and receives a new ſtroke in the fall of the ſaw, which works only in going down; the wheel Z is at that time without any motion, and therefore communicates none to the chariot. It is during that reſt of the piece of wood that the ſtroke of the ſaw is given; and as the ſaw is broader at the top than at the bottom, it leans on the length of the wood, which is an ingenious imitation of the ſawyers, who bring the ſaw down obliquely, becauſe the fibres of wood are not eaſily cut when the ſtroke is tranſverſal: and as the arms of the ſaw move backwards and forwards occaſionally, to give the ſaw a proper inclination on the fibres of the wood; thus the upper iron rod, and the iron at the bottom of the ſaw obey the motion of the lever and handle, ſo as to form with the ſaw the inflexions neceſſary. This motion is continued, and the timber is ſtill brought under the ſaw, till a band of iron faſtened to the extremity of the piece of wood, meets with a trigger which draws out a pin applied to the ſluice to keep it up: when the ſluice falls the water ſtops, and the whole machine is without motion.

Sawing-mills are much uſed abroad, and were lately begun to be introduced in England; but the parliament taking it into conſideration that they would ſpoil the ſawyer's trade, and ruin great numbers of families, thought fit to ſuppreſs them.

Stones, *&c.* are alſo ſawed by an engine, the principal parts of which are repreſented in plate CCXXXIX. fig. 1. n° 1. where ILLI, is a ſquare frame perpendicular to the horizon, moving in the direction LL, in gutters made in the fixed beams AM, CB, and running upon little wheels. IL are two rods of iron, and *op* two hands of iron running along thoſe rods; to theſe are fixed the ſaws S, S. HIK is a triangle fixed to the axis of a great wheel. As the wheel and triangle go about from H towards I, the point I acting againſt the piece G, moves the frame towards MB, together with the ſaws S, S. When I is gone off, the angle K acts againſt the piece F, and moves the frame back again. Then H, and

SAW-MILL

Fig. 1. A Section Transversely



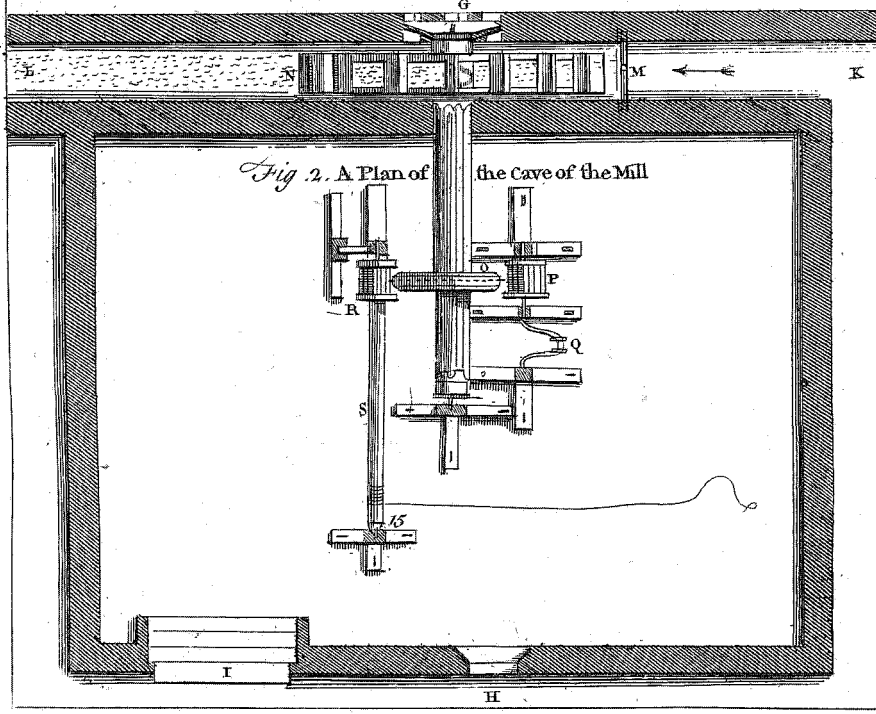


Fig. 2. A Plan of the Cave of the Mill

T. Jefferys sculp.

acting againſt G, moves it forward; and ſo the ſaws are moved backward and forwards, as long as the wheel turns round. As theſe ſaws work by the motion of the engine the hands *op* deſcend. The parts F and G ought to be made curved; and little wheels may be applied at the points of the triangle to take away the friction againſt F and G: and if the power be ſtrong enough, the axle of the wheel may be made to carry more triangles, and work more ſaws. Inſtead of the triangle H I K, the frame may be moved by the two pieces *ab*, *cd*, (*ib.* n° 2.) going through the axis acroſs one another, ſo that *ab* may only act on F, and *cd* on G; F being only in the plane of *ab*'s motion, and G in that of *cd*.

SAXENHAGEN, a town of Weſtphalia, in Germany, twenty miles north-weſt of Hanover.

SAXIFRAGE, *ſaxifraga*, in botany, a genus of the *decandria-digynia* claſs of plants, with a roſaceous flower, conſiſting of five plane ovated petals: the fruit is an unilocular capſule, of an oval form, containing a great many ſeeds. See plate CCXXXVI. fig. 6.

The tuberoſities at the root of the white-flowered ſaxifrage are kept in the ſhops, under the name of ſaxifrage-ſeeds: they are diuretic and attenuant; and therefore good in nephritic caſes and obſtructions of the menſes and viſcera: ſome alſo recommend them in the jaundice and dropſy.

As to the ſaxifrage of the antients, it is not known what plant they meant by it; ſo that no benefit can be reaped from their accounts of its virtues.

It is alſo to be obſerved, that though many different plants have been called ſaxifrage, from their ſuppoſed power of diſſolving the ſtone in the human bladder, yet it is very certain that none of them poſſeſs ſuch a virtue: thus the chryſoſplenium has been called golden-ſaxifrage; filipendula, red-ſaxifrage; and the common melilot, yellow-ſaxifrage. See the articles CHRYSOSPLENIUM FILIPENDULA, *&c.*

SAXMUNDHAM, a market-town of Suffolk, thirty-two miles eaſt of Bury.

SAXON, or SAXON-LANGUAGE. See LANGUAGE and ENGLISH.

SAXONY, the name of two circles of the german empire, diſtinguiſhed by the epithets upper and lower. The circle of upper-Saxony comprehends the dutchy of Saxony, the marquiſates of Miſnia, Luſatia, and Brandenburg, and the dutchies of Pomerania, Sax-Hall, Sax-Altemburg, Sax-Merſburg, and Sax Naumburg. The circle of lower-Saxony comprehends the dutchies of Mecklenburg, Holſtein, Lawenburg, Lunenburg, Zell, Bremen, Brunſwic, Hanover, and Magdeburg; the principalities of Verden and Halberſtat, and the biſhopric of Hildeſheim.

SAY or SAYE, in commerce, a kind of ſerge, or woollen-ſtuff, much uſed abroad for linings, and by the religious for ſhirts: with us it is uſed for aprons by ſeveral ſorts of artificers, being uſually dyed green.

Double ſays, or ſerge, pay, on importation, a duty of 5 s. $3\frac{72}{100}$ d. the yard, and draw back, on exportation, 2 s. $\frac{30}{100}$ d. Double Flanders ſays pay, by the piece of fifteen yards, on importation, 1 l. 14 s. $7\frac{80}{100}$ d. and draw back, on exportation, 1 l. 10 s. $4\frac{50}{100}$ d. Hounſcot ſays, and milled ſays, pay, by the piece of twenty-four yards, on importation, 1 l. 3 s. $1\frac{20}{100}$ d. and draw back, on exportation, 1 l. 3 d.

SAYBROOK, a port-town of New-england, in the province of Connecticut, ſituated at the mouth of the river of Connecticut: in weſt long. 72°, north lat. 41°.

SAYCOCK, or BONGO. See the article BONGO.

SCAB, or ITCH, in medicine and ſurgery. See the article ITCH.

SCABBARD, in the manege, denotes the ſkin that ſerves as a ſheath, or cover, to a horſe's yard.

SCABELLUM, in antient architecture, a kind of pedeſtal to ſupport buſts. See the article PEDESTAL.

SCABIOUS, *ſcabioſa*, in botany, a plant of the *tetrandria-monogynia* claſs, with a floſculous flower, each floſcule being monopetalous and tubular, and ſlightly divided into four or five ſegments at the limb; there is no pericarpium; the ſeeds, which are ſingle after each floſcule, being crowned with their proper cups, and contained in the common receptacle.

The leaves of ſcabious ſtand recommended as aperient, ſudorific, and expectorant; but the preſent practice has little dependance on theſe virtues.

SCAFFOLD,

SCAFFOLD, among builders, an aſſemblage of planks and boards, ſuſtained by treſſels and pieces of wood fixed in the wall; whereon maſons, bricklayers, &c. ſtand to work in building high walls, &c. and plaſterers, in plaſtering ceilings, &c.

Scaffold alſo denotes a timber-work raiſed in the manner of an amphitheatre, for the more commodious viewing any ſhew or ceremony: it is alſo uſed for a little ſtage, raiſed in ſome public place, whereon to behead criminals.

SCAGEN, or SCAGERIFF, a promontory of north-Jutland, at the entrance of the Scagerrack-ſea, or paſſage out of the ocean into the Baltic-ſea: eaſt long. 10°, north lat. 58°.

SCALA, in anatomy, a name given to two canals in the cochlea of the ear. See the article EAR.

SCALA, in architecture, the ſame with ſtair-caſe. See the article STAIR.

SCALA, in geography, a town of the kingdom of Naples, ſituated on the gulph of Salerno, twenty miles ſouth of the city of Naples.

SCALÆ GEMONIÆ. See GEMONIÆ.

SCALADO, or SCALADE, in the art of war, a furious aſſault made on the wall or rampart of a city, or other fortified place, by means of ladders, without carrying on works in form to ſecure the men.

SCALE, a mathematical inſtrument, conſiſting of ſeveral lines drawn on wood, braſs, ſilver, &c. and variouſly divided, according to the purpoſes it is intended to ſerve; whence it acquires various denominations, as the plain ſcale, diagonal-ſcale, plotting ſcale, Gunter's-ſcale, &c.

Conſtruction and uſe of the plain SCALE. The plain-ſcale is an inſtrument much uſed in navigation, &c. for ſolving the ſeveral caſes of ſailing. See the article NAVIGATION.

Having deſcribed the circle DBCA, (plate CCXXXIX. fig. 2. n° 1.) and divided it into four quadrants, by the diameters A B and C D croſſing each other at right angles: 1. To project the line of tangents, from the end C of the diameter C D, erect the perpendicular C G; then dividing the arch C B into nine equal parts, from the center E, through the ſeveral diviſions of the quadrant C B, draw lines till they cut the perpendicular C G, which will thereby become a line of tangents.

2. For the ſemi tangents, or half tangents, let lines be drawn from the point D, through the ſame diviſions upon the arch C B; and they will divide the radius B E into a line of ſemi-tangents, as is evident from Euclid. lib. 3. prop. 20.

3. For the ſecants, tranſfer the lines drawn from the center through the ſeveral diviſions of the quadrant C B to form the line of tangents, to the line E B continued to F, and the line E F will be a line of ſecants.

4. For the ſines, from the ſeveral diviſions of the quadrant C B, let fall perpendiculars upon the radius C E; which will will thereby be divided into a line of ſines, to be numbered from E to C for the right ſines, and from C to E for the verſed ſines: and theſe verſed ſines may be continued to 180°, if the ſame diviſions be tranſferred on the other ſide of the center E.

5. For the chords: the arch C B being divided into nine equal parts, in the points 10, 20, 30, &c. if lines be imagined to be drawn from C to theſe diviſions, they will be the chords of their reſpective arches: wherefore ſetting one foot of your compaſſes in the point C, and tranſferring the ſeveral lengths, C 10, C 20, C 30, &c. to the line C B, it will thereby be divided into a line of chords. Theſe ſeveral lines, which in the figure are drawn but to every tenth degree, might in the very ſame manner be conſtructed to every degree, if the circle were made large enough to admit of ninety diſtinct diviſions in the arch of one of its quadrants.

6. A line of rhumbs is thus conſtructed: divide the arch D B into eight equal parts, in the points 1, 2, 3, 4, &c. then ſetting one foot of the compaſſes in D, tranſfer the ſeveral diſtances D 1, D 2, D 3, from the arch to the line D B; which by this means will be divided into a line of rhumbs, each of which will anſwer to an angle of 11° 15'.

7. To conſtruct a line of longitude, divide the radius E A into ſixty equal parts, marking every ten with their proper numbers; from theſe diviſions let fall perpendiculars upon the arch A D, and having drawn the line A D, with one foot of the compaſſes in A, tranſfer the ſeveral diſtances, where the perpendiculars cut the arch to the line A D, which will thereby be divided into a line of longitude.

8. To project the line of latitude, the radius C E being already divided into a line of ſines, lay a ruler from the point B through

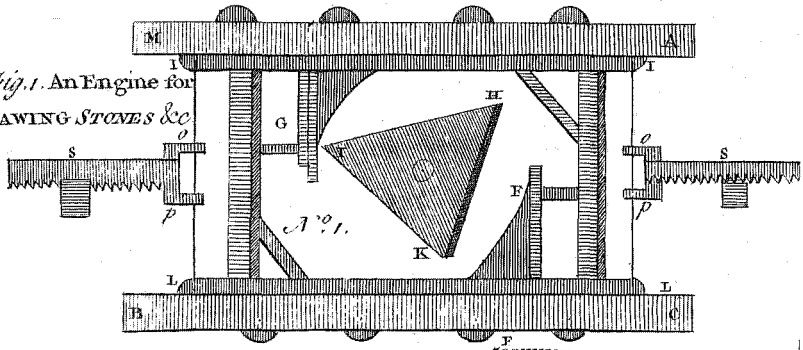
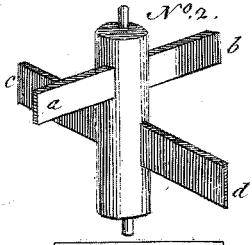


Fig. 1. An Engine for SAWING STONES &c



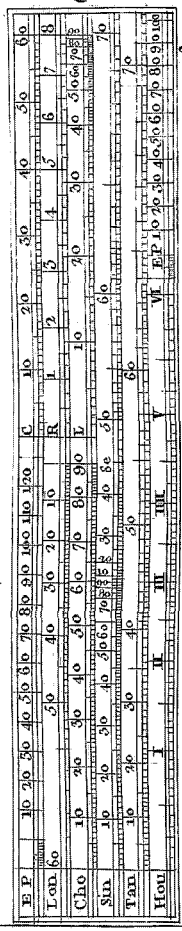
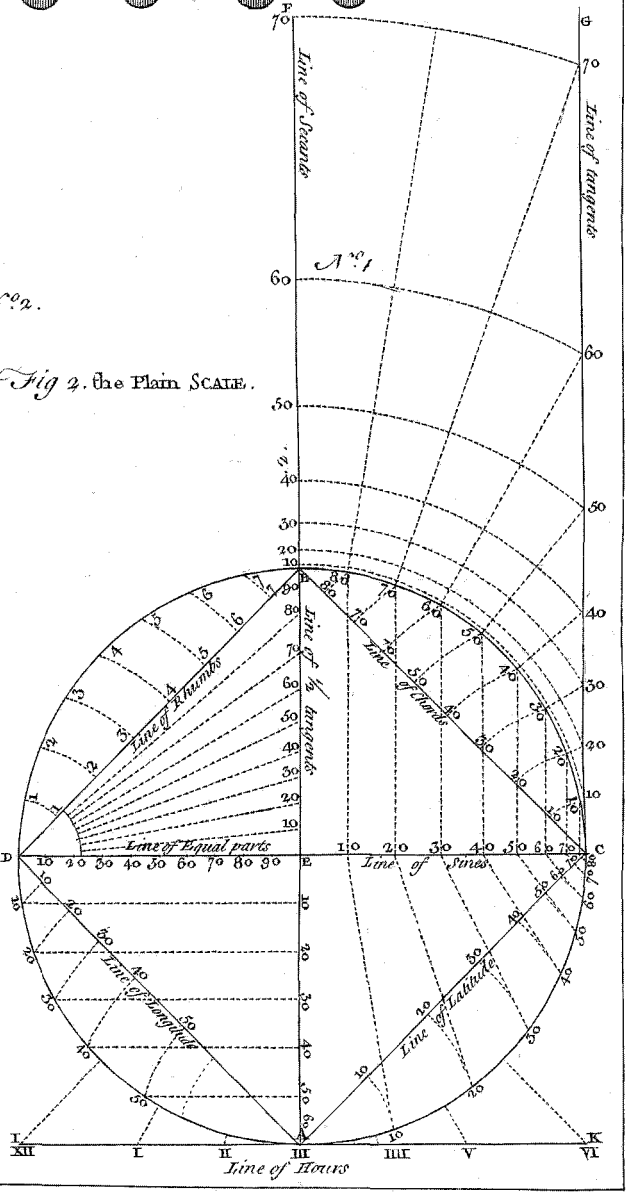


Fig 2. the Plain SCALE.



J. Jefferys sculp

Fig. 1. Diagonal-Scale.

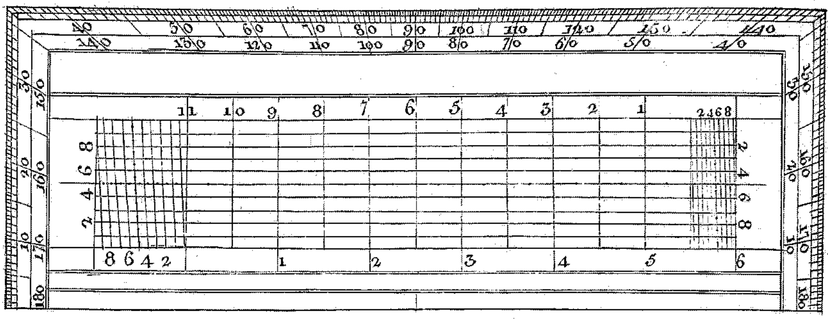


Fig 2. Scarifying Instruments.

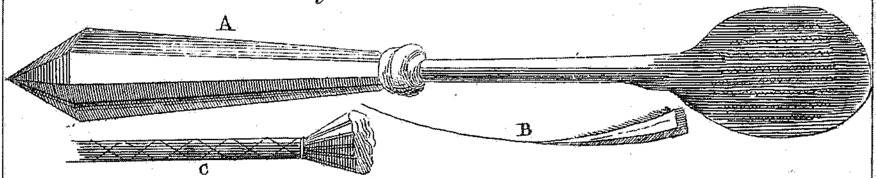


Fig 3 Scarp

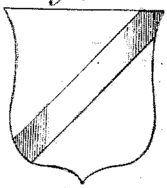
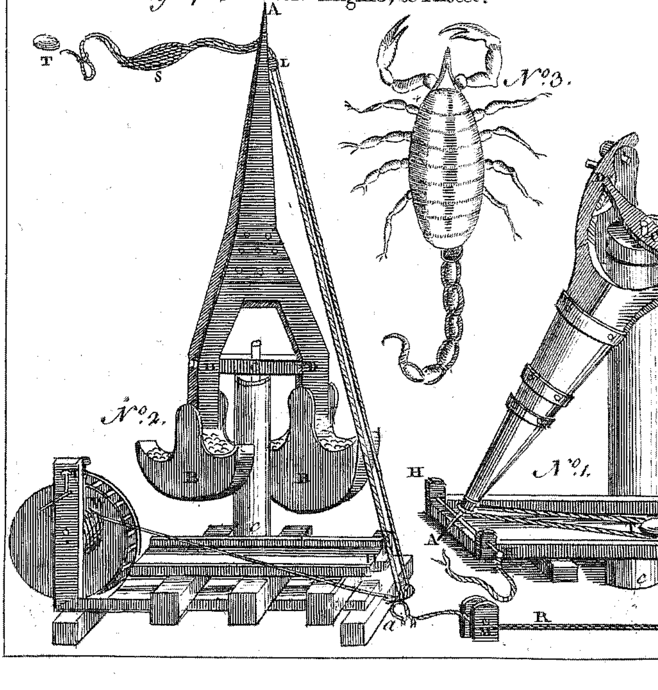
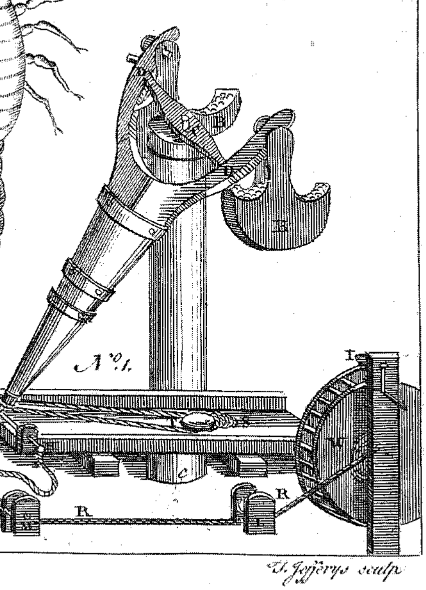


Fig. 4. Scorpion-Engine, & Insect.

T. Jefferys sculp

B through each of the ſaid diviſions, and mark the points cut on the oppoſite arch AC with the numbers 10, 20, 30, &c. then having drawn the line AC, with one foot of your compaſſes in A, tranſfer the ſeveral interſections of the arch to the ſaid line, which will thereby become a line of latitude.

9. To project the hour-line, draw the tangent IK equal and parallel to the diameter CD, and divide half the arch of each quadrant AC, and AD, from the point A, into three equal parts, which will be 15° each part, for the degrees of every hour from twelve to ſix; each of which parts are to be again ſubdivided into halves and quarters, &c. then drawing lines from the center E, through each of their diviſions and ſubdiviſions, till they cut the tangent IK, the ſaid tangent will thereby be divided into a line of hours.

10. To the above lines may be added a line of inclination of meridians, which is projected in the ſame manner as the hour-line; being only divided into degrees, inſtead of time, every fifteen degrees being equal to an hour.

Now if theſe lines, with their reſpective diviſions, be transferred to a ſcale, and there alſo be added a line of equal parts, the inſtrument called the plain-ſcale will be compleated, as in *ib.* n°2. and as to the uſes of theſe lines, thoſe of tangents, ſemi-tangents, and ſecants, ſerve to find the centers and poles of projected circles, in the ſtereographic projection of the ſphere, &c. the line of ſines ſerves for the orthographic projection of the ſphere; the line of chords ſerves either to lay down any angle, or meaſure the quantity of one already laid down: the line of rhumbs ſerves with more readineſs than the line of chords, to lay down or meaſure the angle of a ſhip's courſe in navigation: the line of longitude being laid down on the ſcale contiguous to a line of chords of the ſame radius, and numbered the contrary way, ſhews by inſpection how many miles there are in a degree of longitude in each parallel of latitude; reckoning the latitude upon the line of chords, and the miles of longitude upon the line of longitude: the two lines of latitudes and hours are uſed conjointly, and ſerve very readily to mark the hour-lines in the conſtruction of dials, on any kind of upright planes.

For the farther uſes of the plain-ſcale, ſee the articles TRIGONOMETRY, NAVIGATION, PLOTTING, &c.

Diagonal-SCALE is projected thus: firſt draw eleven parallel lines at equal diſtances (ſee plate CCXL. fig. 1.) the whole length of which being divided into a certain number of equal parts, according to the length of the ſcale, by perpendicular parallels, let the firſt diviſion be again ſubdivided into ten equal parts, both above and below; then drawing the oblique lines from the firſt perpendicular below to the firſt ſubdiviſion above, and from the firſt ſub-diviſion below to the ſecond ſub-diviſion above, &c. the firſt ſpace ſhall thereby be exactly divided into one hundred equal parts; for as each of theſe ſub-diviſions is one tenth part of the whole firſt ſpace or diviſion, ſo each parallel above it is one tenth of ſuch ſub-diviſion, and conſequently one hundredth part of the whole firſt ſpace; and if there be ten of the larger diviſions, one thouſandth part of the whole ſcale. If therefore the larger diviſions be accounted units, the firſt ſub-diviſions will be tenth parts of an unit; and the ſecond ſub-diviſions, marked by the diagonals on the parallels, hundredth parts of an unit. Again, if the larger diviſions be reckoned tens, the firſt ſub-diviſions will be units, and the ſecond ſub-diviſions tenth parts: and if the larger diviſions be accounted hundredths, the firſt ſub-diviſions will be tens, and the ſecond units: and ſo on.

Gunter's SCALE, an inſtrument, ſo called from Mr. Gunter its inventor, and is generally made of box: there are two ſorts, the long Gunter and the ſliding Gunter, having both the ſame lines, but differently uſed, the former with the compaſſes, the latter by ſliding. The lines now generally delineated on thoſe inſtruments are the following, *viz.* a line of numbers, of ſines, tangents, verſed ſines, ſine of the rhumb, tangent of the rhumb, meridional parts, and equal parts; which are conſtructed after the following manner:

The line of numbers is no other than the logarithmic ſcale of proportionals, wherein the diſtance between each diviſion is equal to the number of mean proportionals contained between the two terms, in ſuch parts as the diſtance between 1 and 10 is 1000, &c. = the logarithm of that number. Hence it follows, that, if the number of equal parts expreſſed by the logarithm of any number be taken from the ſame ſcale of equal parts, and ſet off from 1 on the line of numbers, the

diviſion will repreſent the number anſwering to that logarithm. Thus, if you take .954, &c. (the logarithms of 9) of the ſame parts, and ſet it off from 1 towards 10, you will have the diviſion ſtanding againſt the number 9. In like manner, if you ſet off .903, &c. .845, &c. .778, &c. (the logarithms of 8, 7, 6) of the ſame equal parts from 1 towards 10, you will have the diviſions anſwering to the numbers 8, 7, 6. After the ſame manner may the whole line be conſtructed.

The line of numbers being thus conſtructed, if the numbers anſwering to the natural ſines and tangents of any arch, in ſuch parts as the radius is 10000, &c. be found upon the line of numbers, right againſt them will ſtand the reſpective diviſions anſwering to the reſpective arches, or which is the ſame thing, if the diſtance between the center and that diviſion of the line of numbers, which expreſſes the number anſwering to the natural ſine or tangent of any arch, be ſet off on its reſpective line from its center towards the left hand, it will give the point anſwering to the ſine or tangent of that arch: thus the natural ſine of 30 degrees being 5000, &c. if the diſtance between the center of the line of numbers (which in this caſe is = 10000, &c. = the radius) and the diviſion, on the ſame line repreſenting 5000, &c. be ſet off from the center, or 90 degrees, on the line of ſines, towards the left hand, it will give the point anſwering to the ſine of 30 degrees. And after the ſame manner may the whole line of ſines, tangents, and verſed ſines be divided. See the article GUNTER.

The line of ſines, tangents, and verſed ſines being thus conſtructed, the line ſine of the rhumb, and tangent of the rhumb are eaſily divided; for, if the degrees and minutes anſwering to the angle which every rhumb makes with the meridian, be transferred from its reſpective line to that which is to be divided, we ſhall have the ſeveral points required: thus if the diſtance between the radius or center, and ſine of 45 degrees = the fourth rhumb, be ſet off upon the line ſine of the rhumb, we ſhall have the point anſwering to the ſine of the fourth rhumb; and after the ſame manner may both theſe lines be conſtructed. The line of meridional parts is conſtructed from the table of meridional parts, in the ſame manner as the line of numbers is from the logarithms.

The lines being thus conſtructed, all problems relating to arithmetic, trigonometry, and their depending ſciences, may be ſolved by the extent of the compaſſes only; and, as all queſtions are reducible to proportions, the general rule is, to extend the compaſſes from the firſt term to the ſecond, and the ſame extent of the compaſſes will reach from the third to the fourth; which fourth term muſt be ſo continued as to be the thing required, which a little practice will render eaſy.

SCALE, *ſcala*, in muſic, is a denomination given to the arrangement of the ſix ſyllables invented by Guido Aretine, *ut, re, mi, fa, ſol, la,* called alſo gammut. See the article GAMMUT.

It bears the name ſcale (*q. d.* ladder) by reaſon it repreſents a kind of ladder, by means whereof, the voice riſes to acute, or deſcends to grave; each of ſix ſyllables being, as it were, one ſtep of the ladder. Scale is alſo uſed for a ſeries of ſounds riſing or falling towards acuteneſs or gravity, from any given pitch of tune, to the greateſt diſtance that is fit or practicable, through ſuch intermediate degrees as make the ſucceſſion moſt agreeable and perfect, and in which we have all the harmonical intervals moſt commodiouſly divided. See INTERVAL.

This ſcale is otherwiſe called an univerſal ſyſtem, as including all the particular ſyſtems belonging to muſic. See SYSTEM.

Origin and conſtruction of the ſcale of muſic. Every concord or harmonical interval is reſolvable into a certain number of degrees or parts; the octave, for inſtance, into three great tones, two leſs tones, and two ſemi-tones; the greater ſixth into two greater tones, one leſs tone, and two ſemi-tones; the fifth into two greater tones, one leſs tone, and one ſemi-tone; the fourth into one greater tone, one leſs tone, and one ſemi-tone; the greater third into one greater tone, and one leſs tone; and the leſſer third into one greater tone and one leſs tone. It is true, there are variety of other intervals or degrees, beſides greater tones, leſs tones, and ſemi-tones, into which the concords may be divided; but theſe three are preferred to all the reſt, and theſe three alone are in uſe. Farther, it is not any order or progreſſion of theſe degrees that will produce melody; a number, for inſtance, of greater tones, will make no muſic, becauſe no number of them is equal to any

concord, and the ſame is true of the other degrees; there is a neceſſity, therefore, of mixing the degrees to make muſic, and the mixture muſt be ſuch, as that no two of the ſame kind be ever next each other. See the article CONCORD.

A natural and agreeable order of theſe degrees, Mr. Malcolm gives us in the following diviſion of the interval of an octave, wherein (as all the leſſer concords are contained in the greater) the diviſions of all the other ſimple concords are contained. Under the ſeries are the degrees between each term, and the next. In the firſt ſeries, the progreſſion is by the leſs third; in the latter, by the greater third.

Great 2d. gr. 3d. 4th, 5th, 6th, 7th, 8th.

1 : 2/9 : 4/9 : 3/4 : 2/3 : 3/5 : 5/9 : 5/6 : 1/2.
Key or fund. tone. great tone. tone. leſs tone. femi- tone. great tone. leſs tone. great tone. femi- tone.

Great 2d.

1 : 8/9 : 5/6 : 3/4 : 2/3 : 5/8 : 5/6 : 1/2.
Key or fund. tone. great tone. femi- tone. leſs tone. great tone. femi- tone. leſs

Now the ſyſtem of octave containing all the original concords, and the compound concords being only the ſums of the octave and ſome leſs concord; it is evident that, if we would have the ſeries of degrees continued beyond an octave, they are to be continued in the ſame order through a ſecond as through the firſt octave; and ſo on through a third and a fourth octave, &c. and ſuch a ſeries is what we call the ſcale of muſic. See OCTAVE.

Of this there are two different ſpecies, according as the leſs or greater third, or the leſs or greater ſixth are taken in; for both can never ſtand together in relation to the ſame key or fundamental, ſo as to make an harmonical ſcale. But, if by either of theſe ways, we aſcend from a fundamental or given ſound to an octave, the ſucceſſion will be melodious, though the two make two different ſpecies of melody. Indeed, every note is diſcerned with regard to the next; but each of them is concord to the fundamental, except the ſecond and ſeventh. In continuing the ſeries there are two ways of compounding the names of the ſimple interval with the octave; thus a greater or leſſer tone, or ſemi-tone, above an octave or two octaves, &c. or to call them by the number of degrees from the fundamental, as ninth, tenth, &c. See the article SERIES.

In the two ſcales above, the ſeveral terms of the ſcale are expreſſed, by the proportionable ſections of a line repreſented by 1, the key or fundamental of the ſeries. If we would have the ſeries expreſſed in whole numbers, they will ſtand as follows, in each whereof the greateſt number expreſſes the longeſt chord, and the other numbers the reſt in order; ſo that, if any number of chords be in theſe proportions of length, they will expreſs the true degrees and intervals of the ſcale of muſic, as contained in an octave concinnouſly divided in the two different ſpecies above-mentioned.

540 : 480 : 432 : 405 : 360 : 324 : 288 : 270.
great tone. great tone. leſs tone. femi- tone. great tone. leſs tone. great tone. leſs tone. femi- tone.
216 : 192 : 180 : 162 : 144 : 135 : 120 : 108.

This ſcale the antients called the diatonic ſcale, becauſe proceeding by tones and ſemitones. See the article DIATONIC.

The moderns call it ſimply the ſcale, as being the only one now in uſe; and ſometimes the natural ſcale, becauſe its degrees and their order are the moſt agreeable and concinnous, and preferable, by by the conſent both of ſenſe and reaſon, to all other directions ever inſtituted. Thoſe others are the chromatic and enharmoniac ſcales, which, with the diatonic, made the three ſcales or genera of melody of the antients. See the article CHROMATIC, &c.

The deſign of the ſcale of muſic is to ſhew how a voice may riſe and fall leſs than any harmonical interval, and thereby move from one extreme of any interval, to the other, in the moſt agreeable ſucceſſion of ſounds. The ſcale, therefore, is a ſyſtem exhibiting the whole principles of muſic; which are either harmonical intervals (commonly called concords) or concinnous intervals. The firſt are the eſſential principles, the other ſubſervient to them, to make the greater variety. See the article MUSIC.

Accordingly, in the ſcale we have all the concords with their concinnous degrees ſo placed, as to make the moſt perfect ſucceſſion of ſounds from any given fundamental or key, which is ſuppoſed to be repreſented by 1. It is not to be ſuppoſed that the voice is never to move up and down by any other more immediate diſtances than thoſe of the concinnous degrees; for, though that be the

moſt uſual movement, yet, to move by harmonical diſtances, as concords, at once, is not excluded, but is even abſolutely neceſſary. In effect, the degrees were only invented for variety's ſake, and that we might not always move up and down by harmonic intervals, though thoſe are the moſt perfect, the others deriving all their agreeableneſs from their ſubſerviency to them. See CONCORD. Add, that beſides the harmonical and concinnous intervals, which are the immediate principles of muſic, and are directly applied in practice; there are other diſcord-relations which happen unavoidably in muſic in a kind of accidental and indirect manner; for, in the ſucceſſion of the ſeveral notes of the ſcale, there are to be conſidered, not only the relations of theſe that ſucceed others immediately, but alſo of thoſe betwixt which other notes intervene. Now the immediate ſucceſſion may be conducted ſo as to produce good melody, and yet among the diſtant notes there may be very groſs diſcords that would not be allowed in immediate ſucceſſion, much leſs in conſonance. Thus, in the firſt ſeries or ſcale above delivered, though the progreſſion be melodious, as the terms refer to one common fundamental, yet are there ſeveral diſcords among the mutual relations of the terms; *e. gr.* from 4th to 7th is 32 : 45, and from the greater 2d to the greater 6th is 27 : 40, and from the greater 2d to 4th is 27 : 32, which are all diſcords; and the ſame will happen in the ſecond ſeries. See the article DISCORD.

SCALE, in geography and architecture, a a line divided into equal parts, placed at the bottom of a map, or plan, to ſerve as a common meaſure for all the parts of the building, or all the diſtances and places of the map.

SCALENE, or SCALENOUS TRIANGLE, *ſcalenum*, in geometry, a triangle whoſe ſides and angles are unequal. See the article TRIANGLE.

SCALENUS, in anatomy, a name given to one of the flexors of the neck. This muſcle has its origin from the firſt, ſecond, and ſometimes the third rib; and is inſerted into the apophyſes of the vertebræ of the neck, and is by ſome juſtly referred to the number of the elevators of the thorax. The ſcalenus is frequently divided into three parts, hence ſome anatomical writers have made three muſcles of it, under the names of the firſt, the ſecond, and the third ſcalenus.

SCALITS, a town of Upper Hungary, ſituated on the confines of Moravia, thirty-five miles north of Preſburg.

SCALLOP, or the IRISH SCALLOP, in ichthyology, a name for the blue-ribbed red pecten variegated with white; being about two inches long, and nearly as much in breadth, having on the ſurface about fifteen broad depreſſed ribs placed at nearly equal diſtances from one another; the valves are very little elevated, and the ears are moderately large, and one a little bigger than the other. See the article PECTEN.

SCALLOWAY, a town on the weſt ſide of Mainland, one of the iſlands of Shetland: weſt long. 1° 5′, north lat. 61° 12′.

SCALPEL, in ſurgery, a kind of knife uſed in anatomical diſſections and operations in ſurgery. See KNIFE.

SCALPER, or SCALPING-IRON, a ſurgeon's inſtrument uſed for ſcraping foul carious bones.

SCALPTOR ANI, in anatomy. See the article LATISSIMUS DORSI.

SCAMILLI IMPARES, in the antient architecture, certain zoccos or blocks which ſerve to raiſe the reſt of the members of an order, column, ſtatue, or the like, and to prevent their being loſt to the eye, which may chance to be placed below the level, or below the projecture of ſome of the ornaments.

SCAMMONY, in the materia medica, is a concreted vegetable juice of a plant of the ſame name, partly of the reſin and partly of the gum-kind, of which there are two ſorts, diſtinguiſhed by the names of the places from whence they are brought.

The Aleppo ſcammony is of a ſpongy texture, light and friable: it is of a faint diſagreeable ſmell, and its taſte is biteriſh, very nauſeous, and acrimonious. The Smyrna ſcammony is conſiderably hard and heavy, of a black colour, and of a much ſtronger ſmell and taſte than the former, otherwiſe it much reſembles it.

In general, ſcammony is to be choſen friable and eaſily powdered, gloſſy when freſh broken; ſuch as grows white on being moiſtened with the ſpittle; free from dirt, ſand, or other foulneſſes, and not too violently acrimonious in its taſte. Scammony is in great eſteem and frequent uſe, and would be more ſo, if it were

were more to be depended upon: but there is ſo much difference in the purgative virtue of ſome maſſes of it, and that of others, that it is ſeldom to be depended upon alone in extemporaneous practice. It is, however, an ingredient in many compoſitions of the ſhops; and theſe are preſcribed, with other cathartics, for purging off ſerous humours. It is in general, however, a better purge for robuſt people than for thoſe of more delicate conſtitutions, though with the correctives with which it is joined, it is given with ſafety and ſucceſs to children. The chemical writers have given us many preparations of ſcammony, among which are a tincture and a reſin; but the ſcammony in ſubſtance is preferable to either; for they both irritate more, and yet purge leſs; the reſin itſelf given in an equal doſe with the crude ſcammony, will give fewer ſtools, and thoſe attended with worſe gripings. The antients uſed ſcammony externally for cutaneous eruptions, and to ſoften hard tumours; but at preſent it is uſed only as a purge. For the preparation of ſcammony by baking it in a quince, See the article DIAGRYDIUM.

SCANDALUM MAGNATUM, in law, is a defamatory ſpeech or writing to the injury of a perſon of dignity; for which a writ that bears the ſame name is granted for the recovery of damages. By ſtatute, no perſon is either by writing or ſpeaking to publiſh any falſe or ſcandalous news of any lord, prelate, officer of the government, judge, *&c.* on pain of impriſonment, till he produce his author; and if the ſame be publiſhed in a libel, the publiſher is indictable, and may be fined and impriſoned. See LIBEL.

When an action of ſcandalum magnatum is brought, the ſame muſt be ſued in the name of the king and the party, on which the plaintiff recovers his damages for the wrong, and the defendant is to be impriſoned on the king's account. It is here to be obſerved, that the words ſpoke ſhall be taken in the worſt ſenſe, to preſerve the honour of great perſons; though at the ſame time it is ſaid, a defendant may juſtify in this action, ſetting forth the ſpecial matter.

SCANDEROON, a port-town of Aleppo, in aſiatic Turky, ſituated on the coaſt of the Leſſer Aſia: eaſt long. 37°, north lat. 36° 15′.

SCANDINAVIA, a large country which conſiſted of Sweden, Denmark, and Norway, which were ſometimes under the government of one prince; but is now under the dominion of Sweden and Denmark.

SCANDIX, or SCANDYX, in botany, a plant of the *pentandria-digynia* claſs, the compound flower of which is made up of hermaphrodite ones on the diſc, and female ones in the radius: there is no pericarpium, the ſeeds, which are two in number and ſubluated, being joined together ſidewiſe.

This genus comprehends the venus's comb or ſhepherd's needle, and chervil of authors.

SCANNING, *ſcanſio*, in poetry, the meaſuring of a verſe by feet, in order to ſee whether or no the quantities be duely obſerved.

The term is chiefly uſed in regard to the greek and latin verſes. Thus an hexameter verſe is ſcanned, by reſolving it into ſix feet; a pentameter, by reſolving it into five feet, *&c.* examples of which may be ſeen under the articles PENTAMETER, HEXAMETER, *&c.*

SCAPE-GOAT, in jewiſh antiquity, the goat which was ſet at liberty on the great day of expiation. See EXPIATION.

Spencer is of opinion, that the ſcape-goat was called azazel, becauſe it was ſent to azazel, *i. e.* the devil; the reaſons of which ceremony, he takes to be theſe. 1. That the goat, loaded with the ſins of the people, and ſent to azazel, might denote the miſerable condition of of ſinners. 2. The goat was ſent thus loaded to the dæmons, to ſhew that they were impure, and to deter the people from worſhiping them. 3. That the goat ſent to azazel ſufficiently expiating the ſins of the Iſraelites, they might the more willingly abſtain from the expiatory ſacrifices of the heathens.

SCAPHISM, σκαφισμος, in perſian antiquity, a kind of torture, or capital puniſhment; which conſiſted in locking the criminal in a ſort of box made of the trunk of a tree, with only five holes for his head, arms and legs to come through; then anointing the parts with honey and milk, in order to invite the flies, *&c.* he was expoſed to the ſun; and, in this unhappy ſituation, he continued till death put an end to his miſery.

SCAPHOIDES, in anatomy, the ſame with naviculare os. See the article NAVICULARE OS.

SCAPULA, in anatomy, the ſhoulder-blade, a triangular bone, ſituated on the outſide

outſide of the ribs, and commonly extended from the ſecond to the ſeventh rib; its ſuperior poſterior angle, when it is in the leaſt ſtraining poſition, being about three inches from the ſpinal proceſſes of the vertebræ, while the long ſide between that angle and the inferior one is ſtretched obliquely forward as it deſcends, having nothing between it and the ribs, except the thin extremities of ſome muſcles; but as the ſcapula advances forwards to its articulation with the arm bone, its diſtance from the ribs increaſes.

In the examination of the ſcapula, ſays Heiſter, we are to obſerve the head of the bone, with its glenoide cavity, called by ſome the acetabulum of the ſcapula; its neck; its baſe; its two angles, the ſuperior and inferior; its ſuperior and inferior coſtæ; its anterior ſurface, which is ſmooth and concave; and its poſterior, which is uneven. After theſe we are to obſerve its ſpine, its creſt, and its acromion; its ſupra and infra ſpinate cavity; its coracoide proceſs, and its two inciſures, the one between the neck and the acromion, the other behind the coracoide proceſs; and the robuſt ligament which joins the acromion and coracoide proceſs, and prevents the laxation of the os humeri upwards.

The uſes of the ſcapula are to ſuſtain the arms, and join them to the body, to ſerve for the inſertion of ſeveral muſcles, and to add ſomewhat to the neceſſary defence of the parts contained within the thorax.

SCAPULAR, *ſcapulares*, in anatomy, a name given to two pair of arteries, and as many veins; the arteries are the external ſcapular artery, which is ſent from the ſubclavians to the external parts of the ſcapula; and the internal ſcapular artery, which ariſes from the axillary arteries, and goes to the parts that lie under the ſcapula. The ſcapular veins, which are alſo external and internal, ariſe in like manner from the ſubclavians. See ARTERY and VEIN.

SCAPULAR, or SCAPULARY, a part of the habit of ſeveral religious orders in the church of Rome, worn over the gown, as a badge of peculiar veneration for the bleſſed Virgin. It conſiſts of two narrow breadths or ſlips of cloth, covering the back and the breaſt, and hanging down to the feet.

The devotees of the ſcapulary celebrate its feſtival on the 16th of July. The bulls of the popes have from time to time ſecured indulgences without number to them: but what ſets the ſcapulary above all other practices of devotion, is the ſabbatin bull of pope John XXII. in which that pope declares, that the bleſſed Virgin, one day as he was at prayers, gave him a poſitive promiſe, that ſhe would deliver the carmelites her children, and the brethren of the ſcapulary, out of purgatory, on the ſunday after their death, upon three conditions; 1. to wear their ſcapulary till their death: 2. to preſerve their virginity; and, 3. to abſtain from fleſh every Wedneſday and Friday in the year. See FRATERNITIES and CARMELITES.

SCAPUS, in architecture, the ſhaft or ſhaft of a column. See the article FUST.

In botany, the ſame word is uſed for the ſtrait ſtalk or ſtem of a plant, ſtanding upright like a pillar or column.

SCAR, or ESCHAR, the ſeam or mark of a wound after it is healed. See the article WOUND.

SCARA, a town of Sweden in the province of weſt Gothland, ſixty-ſix miles north-eaſt of Gottenburg.

SCARABÆUS, the BEETLE, in zoology, a numerous genus of inſects, of the coleoptera-order: the antennæ of the beetles are of a clavated figure, and fiſſile longitudinally; and their eggs all hatch into hexapode worms, from which the young beetles are afterwards produced. See the article COLEOPTERA.

We have already deſcribed the cervus volans or ſtag-beetle; beſides which there are numerous other ſpecies, the deſcription of which may be ſeen in Ray's Hiſtory of Inſects, Linnæus's Syſt. Nat. and Hill's Nat. Hiſt.

SCARBOROUGH, a borough and port-town of Yorkſhire, thirty-ſeven miles north-eaſt of York.

It is famous for its medicinal ſprings, and ſends two members to parliament.

SCARDONNA, a port-town of Dalmatia, ſituated on a bay of the gulph of Venice, forty-five miles north of Spalatto.

SCARE-CROW GULL, in ornithology, a name for the black larus with grey wings and red legs, being of the ſize of the common pigeon. See LARUS.

SCARIFICATION, in ſurgery, the operation of making ſeveral inciſions in the ſkin by means of lancets, or other inſtruments, particularly the cupping-inſtrument. See the article CUPPING.

With

With regard to the uſefulneſs of ſcarification, Heiſter obſerves, that as much and as thick blood may be diſcharged this way as by phlebotomy, and that of conſequence it muſt be equally beneficial in all diſorders which require bleeding. Beſides, ſcarification is highly neceſſary in violent inflammations, incipient or confirmed mortifications, peſtilential carbuncles, and the like, in order to diſcharge the ſtagnant and vitiated blood, by making many ſmall wounds or inciſions with a ſcalpel or lancet. Heiſter alſo thinks ſcarification of the gums, in the tooth-ach, may not unfrequently be very uſeful; as of the eyes in many diſorders, if performed with caution.

The inſtruments uſed by different operators for ſcarifying the eyes, are different: ſome of the antients uſed a ſteel-raſp in form of a ſpoon, ſee letter A plate CCXL. fig. 2. others uſed a prickly thiſtle, like the atractylis; or, the equiſetum majus. But the lateſt and beſt inſtrument for this operation, is the beards of barley or rye, furniſhed with rows of ſmall hooks, repreſented, *ibid.* at letter B. Ten, twelve, or fifteen of theſe beards may be tied together, ſo as to form a kind of bruſh, as at C; with which the inſide of the eye-lids, and even the eye itſelf, may be ſcarified. However, ſuch a bruſh cannot be uſed more than once, as a very ſmall force blunts it; it is alſo to be obſerved, that the beards of old or ripe barley is not ſo proper as thoſe of barley not quite ripe. Heiſter thinks this operation may be of conſiderable ſervice in all inflammatory diſorders of the eyes; but at the ſame time thinks bliſters, phlebotomy, and ſcarifications in other parts might do as well, and be attended with much leſs pain.

To perform this operation, the patient is to be ſeated in a good light, and his head held ſtill by an aſſiſtant, while the ſurgeon preſſes his thumb and fore-finger on the eyelids, ſo as to open them, and turn them outward, that their interior red ſurface may come into view; this is much more conveniently performed on the under than on the upper eyelid. When the ſurface is thus turned up, the ſurgeon draws the ſcarifying inſtrument backward and forward over it with great ſwiftneſs, as alſo over the white of the eye, if there be occaſion; and, by this means, opens all the turgid veſſels, and makes them bleed plentifully, fomenting the eye with a ſponge dipped in warm water.

When the operation is over, great care is to be taken, that the wounded parts do not cohere together; the patient muſt move the eyelids about at times to prevent this, and the eye, when bound up at night, muſt have a piece of gold-beater's ſkin applied between the eyelids and the eye.

SCARLET, a beautiful bright red. See the articles RED and COLOUR.

In painting in water-colours, minium mixed with a little vermilion produces a good ſcarlet: but if a flower in a print is to be painted of a ſcarlet-colour, the lights as well as the ſhades ſhould be covered with minium, and the ſhaded parts finiſhed with carmine, which will produce an admirable ſcarlet.

To dye cloth, ſtuff, &c. a ſcarlet, let the ſtuffs be alumed, as for crimſon, in river-water, boil them for two hours, then hang them out a whole night without rinſing; but in the morning rinſe them out. Then in order to dye them, take clean bran-water clean ſkimed, and for every pound of goods put in an ounce of pulverized tartar; having firſt mixed one half of it with half an ounce of cochineal, and when the liquor where the remaining half of the tartar is las boiled, then put in the cochineal, &c. Boil them together, afterwards add half an ounce of aqua fortis, in which a ſmall quantity of ſal armoniac (not bigger than a pea) has been diſſolved; which muſt be put in when the ſtuffs have boiled about a quarter of an hour; then boil them together for a little while, let the liquor cool, and rinſe out the ſtuffs.

To dye a ſcarlet in grain, take ſtale clear wheat-bran liquor, a ſufficient quantity; alum, three pounds; enter twenty yards of broad-cloth, and boil it three hours; cool and waſh it; take fair water, a ſufficient quantity; hedder or ſtrawel, a fit quantity; boil them well; cool them with a little water, enter your cloth and make a bright yellow; cool and waſh it again; take freſh wheat-bran-liquor, a ſufficient quantity; madder, four pounds; enter your cloth at a good heat; handle it to a boiling, cool and waſh it well: take more freſh bran liquor; cochineal in fine powder, five ounces; and tartar, three ounces; enter your cloth, and boil an hour or more, keeping it under the liquor, then cool and waſh it.

SCARLET-FEVER, the ſame with miliary fever. See MILIARY FEVER.

SCAROS, or SAROS, a town of Upper Hungary, near the Carpathian mountains: eaſt long. 20° 40', north latitude 48° 45'.

SCARP, in fortification, is the interior talus, or ſlope of the ditch next the place, at the foot of the rampart.

SCARP, in heraldry, the ſcarf which military commanders wear for ornament.

It is borne ſomewhat like a battoon ſiniſter, but is broader than it, and is continued out to the edges of the field: whereas the battoon is cut off at each end. See plate CCXL. fig. 3.

SCARPANTO, an iſland in the Mediterranean, twenty miles ſouth-weſt of Rhodes: eaſt long. 27°, north lat. 36°.

SCARPE, a river of the Netherlands, which riſes in the province of Artois, and falls into the river Scheld, a little below Mortaigne.

SCARUS, in ichthyology, a ſpecies of the labrus, variegated with purple, green, blue and black. See LABRUS.

SCAVAGE, a toll or cuſtom antiently exacted by mayors, ſheriffs and bailiffs of cities and towns-corporate, and of merchant-ſtrangers, for wares expoſed and offered to ſale within their liberties; which was prohibited by 19 Hen. VII. But the city of London ſtill retains this cuſtom.

SCAVANT, a term purely french, ſignifying learned; it is little uſed in our language, except in the phraſe Journal des Sçavans, a journal of the works of the learned, publiſhed monthly at Paris.

SCAVENGERS, two officers annually choſen in every pariſh in London and its ſuburbs by the church-wardens, conſtables, and other inhabitants, to hire perſons called rakers, with carts, to clean the ſtreets, and carry away the dirt and filth, with the aſhes and duſt from every houſe. For which purpoſe a ſcavenger's tax may be made and levied on the inhabitants, being allowed by the juſtices of the peace; but it muſt not exceed 4d. in the pound, of the rent paid for the houſes. Perſons who refuſe to take upon themſelves the office of ſcavenger, forfeit 10l. 2 W. and M. c. 2. 1 Geo. I. c. 48. 10 Geo. II. c. 22.

SCELASIUS, in natural hiſtory, an animalcule which has viſible limbs, arranged, according to Dr. Hill, in the claſs of the arthronia. See ANIMALCULE.

There are two ſpecies of the ſcelaſius, that with the body of a ſuboval figure of the ſhape of an egg, its ſkin perfectly ſmooth, very thin, and of a pale olive-colour, and ſo tranſparent, that the lineament of the inteſtines are ſeen eaſily through it.

SCENE, *ſcena*, in its primary ſenſe, denoted a theatre, or the place where dramatic pieces, and other public ſhews were exhibited: for it does not appear that the antient poets were at all acquainted with the modern way of changing the ſcenes in the different parts of the play, in order to raiſe the idea of the perſons repreſented by the actors being in different places.

The original ſcene for acting of plays was as ſimple as the repreſentations themſelves; it conſiſted only of a plain plot of ground proper for the occaſion, which was in ſome degree ſhaded by the neighbouring trees, whoſe branches were made to meet together, and their vacancies ſupplied with boards, ſticks, and the like; and to complete the ſhelter, theſe were ſometimes covered with ſkins, and ſometimes with only the branches of other trees newly cut down, and full of leaves. Afterwards more artificial ſcenes or ſcenical repreſentations were introduced, and paintings uſed inſtead of the objects themſelves. Scenes were then of three ſorts, tragic, comic, and ſatyric. The tragic ſcene repreſented ſtately magnificent edifices, with decorations of pillars, ſtatues, and other things ſuitable to the palaces of kings: the comic exhibited private houſes with balconies and windows, in imitation of common buildings: and the ſatyric was the repreſentation of groves, mountains, dens, and other appearances; and theſe decorations either turned on pivots, or ſlid along grooves, as thoſe in our theatres.

To keep cloſe to nature and probability, the ſcene ſhould never be ſhifted from place to place in the courſe of the play: the antients were pretty ſevere in this reſpect, particularly Terence, in ſome of whoſe plays the ſcene never ſhifts at all, but the whole is tranſacted at the door of ſome old man's houſe, whither, with inimitable art, he occaſionally brings the actors. The French are pretty ſtrict with reſpect to this rule; but the Engliſh pay very little regard to it.

Scene is alſo a part or diviſion of a dramatic poem. Thus plays are divided into acts, and acts are again ſubdivided into ſcenes; in which ſenſe the ſcene is properly the perſons preſent at, or concerned

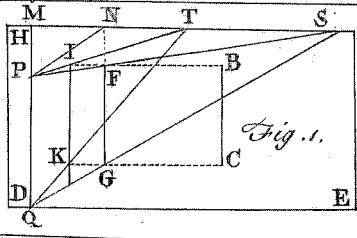


Fig. 1.

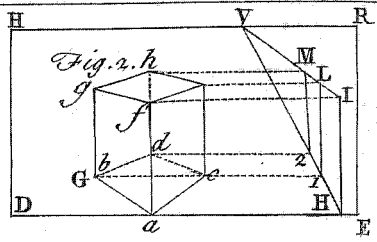


Fig. 2. h

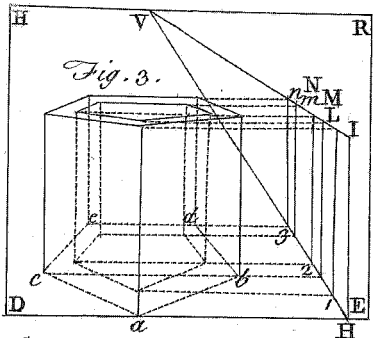


Fig. 3.

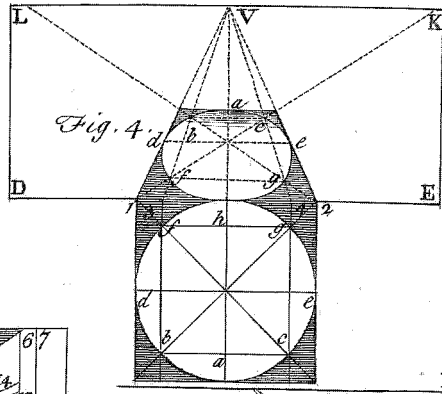


Fig. 4.

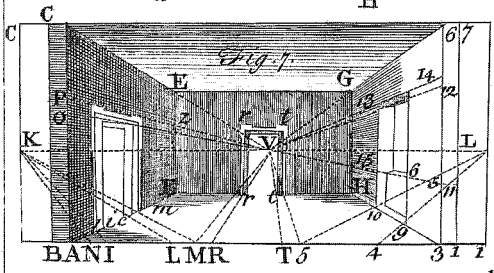


Fig. 7.

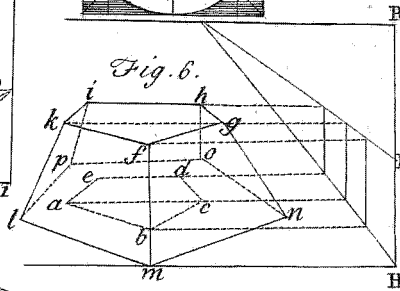


Fig. 6.

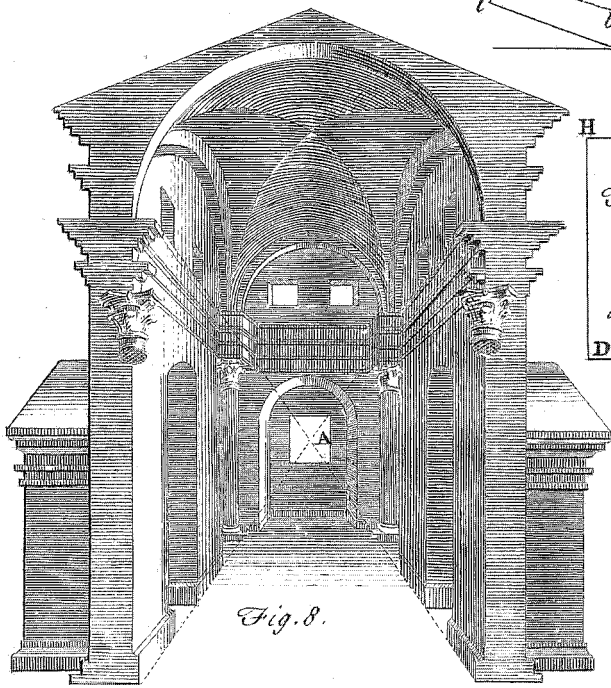


Fig. 8.

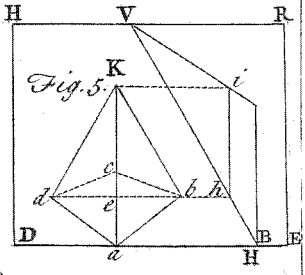


Fig. 5.

cerned in the action on the ſtage at ſuch a time: whenever, therefore, a new actor appears, or an old one diſappears, the action is changed into other hands; and therefore a new ſcene then commences.

It is one of the laws of the ſtage, that the ſcenes be well connected; that is, that one ſucceed another, in ſuch a manner as that the ſtage be never quite empty till the end of the act. See the articles ACT, DRAMA, &c.

SCENIC GAMES, among the antients, were entertainments exhibited on the ſcena or theatre, including plays, dancing, and other theatrical performances.

The Romans were four hundred years without any ſcenic games, and at their inſtitution ſome actors were ſent for from Hetruria; who, without reciting any thing, danced to the ſound of inſtruments; at length they began to rehearſe verſe, from thence they proceeded to plays, and thus by degrees, growing more and more perfect, their ſcenical ſhews were at laſt repreſented, with a juſtneſs and magnificence beyond every thing the world had ever ſeen.

SCENOGRAPHY, in perſpective, the repreſentation of a body on a perſpective plane; or, a deſcription thereof in all its dimenſions, ſuch as it appears to the eye. See the article PERSPECTIVE.

The ichnography of a building, &c. repreſents its plan, or ground-work; the orthography, is a view of the front, or one of its ſides; and the ſcenography, is a view of the whole building, front, ſides, height, and all, raiſed on the geometrical plan. See the articles ICHNOGRAPHY, and ORTHOGRAPHY.

To exhibit the ſcenography of any body, 1. Lay down the baſis, ground-plot, or plan of the body, according to the method taught under the article PERSPECTIVE. 2. Upon the ſeveral points of the plan, raiſe the perſpective heights thus will the ſcenography of the body be completed, excepting that a proper ſhade is to be added.

The method of raiſing the heights is as follows: on any point, as C (plate CCXLI. fig. 1.) to raiſe a perſpective altitude, anſwerable to an objective altitude PQ; on the terreſtrial line raiſe a perpendicular PQ, equal to the given objective altitude; from P and Q, to any point, as T, draw right lines PT and QT; from the given point C, draw a right line CK, parallel to the terreſtrial line DE, and meeting the right line QT in K; and in the point K, upon the line KC, erect a perpendicular IK, which will be the ſcenographic altitude required.

The application of this general method of drawing the ſcenography of a body, is not ſo obvious, in every caſe, but that it may be neceſſary to illuſtrate it by a few examples.

Example I. To exhibit the ſcenography of a cube, viewed by an angle: 1. As the baſis of a cube viewed by an angle, ſtanding on a geometrical plane is a ſquare, viewed by an angle; draw a ſquare, viewed angular-wiſe, on the perſpective table, or plane. 2. Raiſe the ſide HI (fig. 2.) of the ſquare perpendicularly on each point of the terreſtrial line DE; and to any point, as V, of the horizontal line HR, draw the right line VI and VH. 3. From the angles *d*, *b*, and *c*, draw *c* 1, *d* 2, &c. parallel to the terreſtrial line DE. 4. From the points 1 and 2, raiſe L 1 and M 2 perpendicular to the ſame. Laſtly, ſince HI is the height to be raiſed in *a*, LI in *c* and *b*, and M 2 in *d*; in *a* raiſe the line *f a* perpendicular to *a*E; in *b* and *c*, raiſe *b g* and *c e* perpendicular to *b c* 1; and, laſtly, raiſe *d h* perpendicular to *d* 2, and make *a f* = HI, *b g* = *e c* = L 1, and *h d* = M 2; if then the points *g*, *h*, *e*, *f*, be connected by right lines, the ſcenography will be compleat.

Ex. II. To exhibit the ſcenography of a hollow quinquangular priſm. 1. Since the baſe of a hollow quinquangular priſm, ſtanding on a geometrical plane, is a pentagon, with a limb or breadth of a certain dimenſion, find the appearance of this pentagon on a table, or plane. 2. On any point, as H, of the terreſtrial line DE (fig. 3.) raiſe a perpendicular HI, equal to the objective altitude, and to any point, as V, of the horizontal line HR, draw the lines HV and IV. 3. From the ſeveral angles *a*, *b*, *d*, *e*, *c*, of the perſpective ichnography, both the internal and external ones, draw right lines, as *b* 2, *d* 3, &c. parallel to the terreſtrial line; and from the points 1, 2, 3, raiſe perpendiculars to the ſame, as L 1, M 2, *m* 2, N 3, *n* 3. If theſe then be raiſed in the correſpondent points of the ichnography, as in the preceding article, the ſcenography will be compleat.

Ex. III. To exhibit the ſcenography of a cylinder. 1. Since the baſe of a cylinder, ſtanding on a geometrical plane,

is a circle, ſeek the appearance of a circle; in the points *a, b, d, f, h, g, e, c,* (fig. 4) raiſe the apparent altitudes, as in the preceding articles. If now their upper lines be connected by curve lines, in the baſe *a, b, d, f, c, h, e, c,* the ſcenography of their circle will be compleat.

It is evident that thoſe lines are to be omitted, both in the plan and in the elevation, which are not expoſed to the eye; though they are not to be diſregarded from the beginning, as being neceſſary for the finding of other lines; *e. gr.* in the ſcenography of the cube, viewed angle-wiſe, the lines *b d* and *d e* (fig. 2.) in the baſe, and the *d h* in the elevation, are hid from the eye, and are therefore omitted in the deſcription. But, ſince the point H is not to be found, unleſs the point *d* be had in the ichnography, nor the lines *g h* and *d e* be drawn without the height *d h*, the appearance of the point *d* is as neceſſary to be determined in the operation, as the height *h d*.

Ex. IV. To exhibit the ſcenography of a pyramid ſtanding on its baſe. Suppoſe, *e. gr.* it were required to delineate a quadrangular pyramid, viewed by an angle: 1. Since the baſe of ſuch pyramid is a ſquare ſeen by an angle, draw ſuch a ſquare. 2. To find the vertex of the pyramid, *i. e.* a perpendicular let fall from the vertex to the baſe, draw diagonals mutually interſecting each other in *e* (fig. 5.) 3. On any point, as H, of the terreſtrial line D E, raiſe the altitude of the pyramid H I; and, drawing the right lines H V and I V to each point of the horizontal line H R, produce the diagonal *r b*, until it meet the line V H in *h*. Laſtly, from *h* draw *h i* parallel to H I. This, being raiſed on the point *e*, will give the vertex of the pyramid K; conſequently the lines *d* K, K *a*, and K *b* will be determined at the ſame time. After the like manner is the ſcenography of a cone delineated.

Ex. V. To exhibit the ſcenography of a truncated pyramid. Suppoſe the truncated pyramid quadrangular: firſt then, if from the ſeveral angles of the upper baſe be conceived perpendiculars, let fall to the lower baſe, we ſhall have a pentagon, with another inſcribed therein, whoſe ſines are parallel to thoſe of the former; this coincides with a pentagon, furniſhed with a rim or breadth, *&c.* and may therefore be delineated in the ſame manner. 2. Raiſing the altitude of the truncated pyramid I H (fig. 6.) determine the ſcenographic altitudes to be raiſed in the points *a, b, c, d.* If now the points *f, g, h, i, k,* be connected by right lines, and the lines *l k, f m, g n,* be drawn, the ſcenography will be compleat. By drawing two concentric circles in a geometrical plane, and doing every thing elſe, as in this problem, the ſcenography of a truncated pyramid will be drawn.

Ex. VI. To exhibit the ſcenography of walls, columns, *&c.* or to raiſe them on a pavement. 1. Suppoſe a pavement A F, H I (fig. 7. 8.) repreſented in a plan, together with the baſes of the columns, *&c.* if there be any. 2. Upon the terreſtrial line ſet off the thickneſs of the wall B A and 1, 3. 3. Upon A and B, as alſo upon 3 and 1, raiſe perpendiculars A D and B C, as alſo 3, 6, and 1, 7. 4. Connect the points D and 6 with the principal point V, by the right lines D V and 6 V. 5. Upon F and H raiſe perpendiculars H G and E F. Thus will all the walls be delineated. Now to raiſe the pillars, *&c.* there needs nothing but from their ſeveral baſes (whether ſquare or circular) projected on the perſpective plan, to raiſe the indefinite perpendiculars; and on the fundamental line, where interſected by the radius F *a* paſſing thro' the baſe, raiſe the true altitude A D; for D V, being drawn as before, the ſcenographical altitudes will be determined.

Ex. VII. To exhibit the ſcenography of a door in a building. Suppoſe a door required to be delineated in a wall D E F A (fig. 7.) 1. Upon the fundamental line ſet off its diſtance A N from the angle A, together with the breadths of the poſts N I and L M, and the breadth of the gate itſelf L I. 2. To the point of diſtance K, from the ſeveral points N, I, L, M, draw right lines K N, K I, K L, K M, which will determine the breadth of the door *l i*, and the breadths of the poſts *i n* and *m l*. 3. From A to O ſet off the height of the gate A O, and from A to P, the height of the poſts A P. 4. Join O and P with the principal point by right lines P V and O V. 5. Then, from *n, i, l, m,* raiſe perpendiculars, the middle ones whereof are cut by the right line O V in *o*, and extreams, by the right line V P in *p*. Thus will the door be delineated, with its poſts; if the door were to have been exhibited in the wall E F G H, the method would be nearly the ſame: For, 1. Upon the terreſtrial

line

line, ſet off the diſtance of the door from the angle, and thence alſo the breadth of the door R T. 2. From R and T draw right lines to the principal point V, to have the breadth *r t* in the perſpective plan. 3. From *r* and *t* raiſe indefinite perpendiculars to F H. 4. From A to O ſet off the true height A O. Laſtly, from O to the principal point V, draw the right line O V, interſecting E F in ϰ, and make *r r* and *t t* equal to F ϰ. Thus is the door *r r*, *t t*, drawn, and the poſts are eaſily added, as before.

Ex. VIII. To exhibit the ſcenography of windows in a wall. When you know how to repreſent doors, you will find no difficulty in adding windows; all that is here further required, being to ſet off the height of the window from the bottom of the ground. The whole operation is as follows: 1. From 1 to 3, ſet off the thickneſs of the wall at the window; from 3 to 4, its diſtance from the angle 3; and from 4 to 5, its breadth. 2. From 4 and 5, to the point of diſtance L, draw the right lines L 5 and L 4, which will give the perſpective breadth 10, 9 of the window. 3. From 10 and 9, raiſe perpendiculars to the pavement, that is, draw indefinite parallels to 6, 3. 4. From 3 to 11, ſet off the diſtance of the window from the pavement 3, 11, and from 11 to 12, its height 11, 12. Laſtly, from 11 and 12, to the principal point V, draw the lines V 11 and V 12, which interſecting the perpendiculars 10, 13, and 9, 14, in the points 13 and 14, as alſo in 15 and 16, will exhibit the appearance of the window.

From theſe examples which are only applications of the firſt grand rule, it will be eaſily perceived what method to take to delineate any other object, and at any height from the pavement.

SCENOPEGIA, in jewiſh antiquity, the ſame with the feaſt of tabernacles. See the article TABERNACLE.

SCEPTER, a kind of royal ſtaff, or battoon, borne by kings, on ſolemn occaſions, as an enſign of command and authority. See REGALIA.

The ſcepter is of greater antiquity than the crown. The greek tragic poets, put ſcepters into the hands of the moſt antient kings they ever introduce. Among the Romans, the ſcepter was firſt aſſumed by Tarquin the elder. We are informed by Le Gendre, that the ſcepter borne by the firſt race of the french kings was a golden rod, crooked at one end like a croſier, and almoſt always of the ſame height as the king himſelf.

SCEPTER, in aſtronomy, one of the ſix new conſtellations of the ſouthern hemiſphere conſiſting of ſeventeen ſtars.

SCEPTICISM, the doctrines and opinions of the ſceptics, whoſe diſtinguiſhing tenet was, that all things are uncertain and incomprehenſible, and that the mind is never to aſſent to any thing, but to remain in perpetual doubt and ſuſpence. This doctrine was alſo called pyrrhoniſm, from the name of its author. See the article PYRRHONISM.

SCHAFFHOUSE, the capital of the canton of Scaffhouſe, one of the moſt northern cantons of Switzerland: eaſt long. 8° 40′, north lat. 47° 42′.

SCHALHOLT, the capital of Iceland, ſubject to Denmark: weſt long. 19° north lat. 64° 30′.

SCHAMACHIA, a city of Perſia, in the province of Chirvan, ſituated on the weſt ſide of the Caſpian Sea, in eaſt long. 50°, north lat. 41°.

SCHEAT, or SEAT, a fixed ſtar of the ſecond magnitude, in the juncture of the leg with the left ſhoulder of pegaſus. See the article PEGASUS.

SCHELD, a river which riſes in the confines of Picardy, and runs north-eaſt by Cambray, Valenciennes, Tournay, Oudenarde, &c. and receiving the Lis at Ghent, runs eaſt by Dendermond, and then north to Antwerp, below which city it divides into two branches, one called the Weſter-Scheld, which ſeparates Flanders from Zeland, and diſcharges itſelf into the ſea near Fluſhing; and the other called the Oſter-ſcheld, which runs by Bergen-op-zoom, and afterwards between the iſlands Beveland and Schowen, and a little below falls into the ſea.

SCHELLENBURG, a fortreſs of Germany, in the circle of Bavaria, ſituated on the Danube, twenty-two miles weſt of Ingolſtadt.

SCHELLING, an iſland of Holland, at the entrance of the Zuyder Sea, between Flie Iſland and Ameland: eaſt long. 5° 20′, north lat. 53° 34′.

SCHEMNITZ, capital of the mine towns in Upper Hungary, ſixty miles north-eaſt of Preſburg.

SCHENECTIDA, a fortreſs of New-York, in America, ſituated on Hudſon's River, in the province of Albany, a hundred miles north of New York city.

SCHETLAND, or SHETLAND, about forty iſlands, which conſtitute part of

the county of Orkney, or the Orcades, in Scotland, valuable on account of the herring-fiſhery on their ſhores: ſituated between 1° eaſt, and 2° weſt longitude, and between 61° and 62° of north latitude.

SCHEUCHZERIA, in botany, a genus of the *hexandria-trigynia* claſs of plants, having no corolla; the fruit conſiſts of three roundiſh compreſſed inflated bivalve reflexo-diſtant capſules; the ſeed is ſingle and oblong; there are ſometimes ſix germina, and as many capſules, but three is the more natural and uſual number.

SCHINUS, in botany, a genus of the *decandria-monogynia* claſs of plants, the corolla whereof conſiſts of five patent petals; the fruit is a globoſe berry, containing a large globoſe ſingle ſeed.

SCHIRAS, or SHERAS, a city of Perſia, in the province of Fars, 180 miles ſouth of Iſpahan; reckoned the ſecond city in that kingdom.

SCHISM, a ſeparation, or breaking off from communion with any church; on account of ſome diſagreement in matters of faith or diſcipline.

Eccleſiaſtical hiſtory preſents us with a view of ſeveral conſiderable ſchiſms, in which large bodies of men ſeparated from the communion of the church. Such were in the fourth century the ſchiſms of the donatiſts, and the many ſects that ſprung up in the church, as the photinians, apollinarians, &c. the ſchiſm of the church of Antioch, occaſioned by Lucifer, biſhop of Cagliari, in Sardinia, in the fifth century, the ſchiſm of the church of Rome, between Laurentius and Symmachus: in the ninth century, the ſeparation of the greek church from the latin; and particularly the grand ſchiſm of the popes of Rome and Avignon, in the fourteenth century, which laſted till the end of the council of Piſa, 1409.

The romaniſts reckon thirty-four ſchiſms in their church, and beſtow the name engliſh ſchiſm on the reformation in this kingdom. Thoſe of the church of England, again apply the term ſchiſm to the ſeparation of the nonconformiſts, *viz.* the preſbyterians, independants, quakers, &c. who contend for a further reformation.

SCHOENANTHUS, in botany, the ſame with the iſchæmum. See ISCHÆMUM.

SCHOENUS, in botany, a genus of the *triandria-monogynia* claſs of plants, the proper corolla whereof conſiſts of ſix permanent lanceolated acute and connivent petals, unequal in ſize and ſituation, diſpoſed in a kind of imbricated manner, and the exterior ones ſhorter than the reſt; there is no pericarpium; the ſeed is ſingle, gloſſy, of an oval, but ſomewhat triquetrous form, largeſt in the upper part, and contained till ripe in the corolla.

SCHOLASTIC, σχολαστικὸς, ſomething belonging to the ſchools. See SCHOOL.

Scholaſtic was a long time a title of honour, at firſt only given to ſuch as diſtinguiſhed themſelves by their eloquence in declaiming, &c. After Nero, this appellation was beſtowed upon advocates, and afterwards it became reſtrained to ſuch as had the government of eccleſiaſtical ſchools, eſtabliſhed under the firſt race of french kings, who inſtructed the clerks of the church firſt in the humanities, then in theology and the liturgy. Among the greeks, this was the name of an office or dignity anſwering to our divine or theologue.

Scholaſtic divinity, is that part or ſpecies of divinity which clears and diſcuſſes queſtions by reaſon and arguments, in which ſenſe it ſtands, in ſome meaſure, oppoſed to poſitive divinity, which is founded on the authority of fathers, councils, &c. The ſchool-divinity is now fallen into the laſt contempt, and is ſcarce regarded any where, but in ſome of the univerſities, where they are ſtill by their charters obliged to teach it.

SCHOLIAST, or COMMENTATOR, a grammarian, who writes ſcholia, that is, notes, gloſſes, &c. upon antient authors, who have written in the learned languages. See the next article.

SCHOLIUM, a note, annotation, or remark, occaſionally made on ſome paſſage, propoſition, or the like. This term is much uſed in geometry, and other parts of mathematics, where after demonſtrating a propoſition, it is cuſtomary to point out how it might be done ſome other way, or to give ſome advice, or precaution, in order to prevent miſtakes, or add ſome particular uſe, or application thereof.

SCHOOL, *ſchola*, a public place, wherein the languages, humanities, or other arts and ſciences are taught. Thus we ſay, grammar-ſchool, writing-ſchool, &c.

SCHUNDA-PANA, in botany, the ſame with the caryota. See CARYOTA.

SCHWALBASH, a town of Germany, in the circle of the Upper Rhine, and in the territory of the Wetteraw, and county

county of Naſſau, eight miles north of Mentz.

SCHWALBEA, in botany, a genus of the *didynamia-angioſpermia* claſs of plants, the corolla whereof conſiſts of a ringent ſingle petal, the tube is of the length of the cup, the limb is erect, the ſuperior lip is erect, concave, and quite entire, the lower one is trifid and obtuſe; the fruit is either a bilocular capſule, or there is no pericarpium; the ſeed is ſingle, roundiſh, and ſmall.

SCHWARTSBURG, a town of Germany, in the circle of Upper Saxony, and Landgrave of Thuringia, eight miles ſouth-eaſt of Gotha.

SCHWARTZENBURG, a town of Germany, in the circle of Franconia, twenty miles eaſt of Wurtſburg.

SCHWATS, a town of Germany, in the county of Tyrol, ſituated on the river Inn, twenty miles north-eaſt of Inſpruc.

SCHWEIDNITZ, a town of Bohemia, in the dutchy of Sileſia, capital of a dutchy of the ſame name, ſituated twenty-ſix miles ſouth of Breſlaw.

SCHWEINFURT, an imperial city of Germany, in the circle of Franconia, and biſhopric of Wurtſburg, ſituated on the river Maine, in eaſt long. 10° 15′, north 50° 15′.

SCIÆNA, in ichthyology, a genus of the *acanthopterygious* claſs of fiſhes, the whole head and covering of the gills are ſcaly, and one of the laminæ of theſe coverings ſerrated at the edges, the body is compreſſed and broad, the back is acute, there are teeth in the jaws and fauces, the palate and tongue are ſmooth; there is only one fin on the back, which is divided in the middle to the very baſe; the tail is equal at the extremity; this genus comprehends the umbra and the umbrino.

SCIARRI, in natural hiſtory, the matter which runs down in burning torrents from the craters of volcanos, and which probably contains mineral and metallic particles, it being ponderous and hard. Some of the ſciarri are coarſe, and others fine and poliſhed on the ſurface; ſome of them are black, others grey, others reddiſh, and others of the colour of iron, and many of them have coverings of pure ſulphur over their whole ſurface. They ſeem to be the reſult of many ſorts of minerals melted together.

SCIATICA, the HIP-GOUT, a violent and obſtinate pain in the hip, chiefly in the joint, where the head of the thigh-bone is received into the acetabulum of the coxendix. This pain will ſometimes extend itſelf to the lower part of the loins, to the thigh, leg, and even the extremity of the foot, yet outwardly there is no ſwelling, no inflammation, nor change of colour in the ſkin; ſometimes there is ſuch a ſpaſm of the muſcles on the ſide affected, that the patient cannot ſtand upright without the utmoſt pain. When the ſciatica has continued very long, there is ſuch a collection of pituitous humour in the cavity of the joint, that by relaxing the ligaments, it often cauſes a luxation. Sometimes it cauſes an aridura, or waſting away of the adjacent parts. When the pain leaves the hip, and moves downwards, it is a ſign that the ſpaſms are reſolved; a violent motion of the body generally exaſperates the pain. This diſorder may ariſe from the ſame cauſe with that which produces the gout; but it is moſt generally the effect of catching cold, or being expoſed to the open air; it may alſo be occaſioned by contuſions and venereal diſorders. See the article GOUT, *&c.*

After a gentle cathartic, or clyſter, bleeding will be proper, eſpecially in the ancle; alſo leeches applied to the hæmorrhoidal veins, have been found beneficial; ſtrong purges are hurtful, but mercurius dulcis with ſcammony, or ſome other purgative, will be of ſervice; ſome give mercurial emetics, and afterwards mercurial purgatives, repeated twice a week, or as occaſion requires, for ſix times. If the patient is old, lenient purgatives will be moſt proper, and on intermediate days a doſe of calomel, which is afterwards to be purged off, and ſo repeated alternately for ſome time. Outwardly, the linimentum ſaponaceum is recommended by Riverius, Junker, and others; the part is to be anointed with it near the fire. Riverius ſays, he has known an obſtinate ſciatica cured in one day, by applying ſix cupping glaſſes on and about the part affected, and then anointing it with oil of bricks hot, and afterwards covering it with a linnen-cloth, made very hot. Zacutus Luſitanus affirms, that the ſciatica has been cured in a few hours, by applying eight or ten leeches to the part affected. Baglivi obſerves, that if nothing elſe will do, recourſe muſt be had to cauſtics, particularly the leaves of ranunculus, or a mixture of quick lime, and ſoft ſoap.

SCIENCE, *ſcientia*, in philoſophy, denotes any doctrine, deduced from ſelf-evident and

and certain principles, by a regular demonſtration. See DEMONSTRATION, METHOD, and KNOWLEDGE.

Sciences may be properly divided as follows: 1. The knowledge of things, their conſtitutions, properties, and operations: this, in a little more enlarged ſenſe of the word, may be called φυσικὴ, or natural philoſophy; the end of which is ſpeculative truth. See the article *Natural* PHILOSOPHY.

2. The ſkill of rightly applying theſe powers, πρακτικὴ: the moſt conſiderable under this head is ethics, which is the ſeeking out thoſe rules and meaſures of human actions that lead to happineſs, and the means to practiſe them; and the next is mechanics, or the application of the powers of natural agents to the uſes of life. See ETHICS and MECHANICS.

3. The doctrine of ſigns, σημειωτικὴ; the moſt uſual of which being words, it is aptly enough termed logic. See the article LOGIC.

This, ſays Mr. Locke, ſeems to be the moſt general, as well as natural, diviſion of the objects of our underſtanding. For a man can employ his thoughts about nothing but either the contemplation of things themſelves for the diſcovery of truth; or about the things in his own power, which are his actions, for the attainment of his own ends; or the ſigns the mind makes uſe of, both in the one and the other, and the right ordering of them for its clearer information. All which three, *viz.* things, as they are in themſelves knowable; actions, as they depend on us in order to happineſs; and the right uſe of ſigns, in order to knowledge, being *toto cœlo* different, they ſeem to be the three great provinces of the intellectual world, wholly ſeparate and diſtinct one from another.

SCIENTIFIC, or SCIENTIFICAL, ſomething relating to the pure, ſublimer ſciences; or, that abounds in ſcience or knowledge.

SCILLA, the SQUILL, in botany, a genus of the *hexandria-monogynia* claſs of plants, the corolla whereof conſiſts of ſix oval deciduous and very patent petals the fruit is a ſmooth capſule, of a ſub-oval figure, marked with three furrows, formed of three valves, and containing three cells; the ſeeds are numerous and roundiſh.

The middle part of the root of this plant is only uſed in medicine: the apothecaries cut the root perpendicularly in two; and ſeparating the heart and the outer parts, they expoſe the others to dry: this root is extremely acrid, attenuant and diſſolvent: it is apt to prove emetic in whatever form it is given, but this may be prevented by adding a few grains of cinnamon to it: it then becomes a powerful medicine in all obſtructions of the viſcera: it promotes urine and the menſes, and cuts the tough phlegm which almoſt choaks in aſthmas and many other diſorders of the breaſt: the moſt uſual form in which it is preſcribed is that of the oxymel, made of a ſtrong infuſion of the root in vinegar, or made into a ſyrup of honey.

SCILLA, SQUILL, in zoology. See the article SQUILL.

SCILLY, a cluſter of iſlands and rocks, ſituated in the Atlantic-ocean: weſt long. 7°, north lat. 50°.

SCIO, an iſland of Turky, in the Archipelago, ſituated in eaſt long. 27°, north lat. 38° 15′.

SCIOPTIC, a ſphere, or globe of wood, with a circular hole or perforation, wherein a lens is placed. It is ſo fitted that, like the eye of an animal, it may be turned round every way, to be uſed in making experiments of the darkened room. See CAMERA OBSCURA.

SCIRE-FACIAS, in law, a judicial writ moſt commonly iſſued to call a perſon to ſhew cauſe to the court whence it iſſues, why execution of a judgment paſſed ſhould not be made out; as where a plaintiff has recovered debt or damages in a court of record, and does not take out execution in a year and a day after judgment recovered: in that caſe he ſhall have this writ to ſummon the defendant to ſhew cauſe why execution ſhould not be had againſt him upon the ſaid judgment; which if the defendant does not, judgment is given and the plaintiff ſhall have execution. Where a plaintiff or defendant dies, execution may not be ſued out on a judgment till the writ of ſcire-facias is brought and judgment given thereupon. A ſcire-facias muſt likewiſe iſſue where judgment is recovered againſt a feme ſole who marries within the year and day, to ſummon the huſband to ſhew cauſe, *&c.* And when a judgment is obtained againſt a teſtator, a ſcire-facias iſſues againſt the executor, though within a year after the judgment is had; and alſo againſt an adminiſtrator to an inteſtate.

SCIRO,

SCIRO, an iſland of Turky, in the Archipelago, ſituated eaſt long. 25°, lat. 38° 15'.

SCIRPUS, in botany, a genus of the *triandria-monogynia* claſs of plants: there is no corolla nor pericarpium: the ſeed after every flower, is ſingle, and of a triquetrous figure, acuminated, and has villi or hairs on it longer than the cup.

This genus comprehends the club-ruſh and bul-ruſh.

SCIRRHUS σκίρρος, in ſurgery and medicine, a hard tumour of any part of the body, void of pain, ariſing from the inſpiſſation and induration of the fluids contained in a gland, though it may appear in any other part, eſpecially in the fat, being one of the ways wherein an inflammation terminates. [See TUMOUR and INFLAMMATION.

The ſeat of a ſcirrhus is very various, not being confined to the internal parts alone, *viz.* the liver, ſpleen, lungs, meſentery, pancreas, and, in females, to the uterus; but frequently happens to the external parts, as the lips, tongue, tonſils, fauces, palate, gum, neck, mammæ, axillæ, groin, penis, and teſticles, and that generally after a previous inflammation of theſe parts. As ſoon as a ſcirrhus is formed, the neighbouring parts of courſe are impeded in the performance of their offices, and, according to the nature of the part affected, become ſubject to inflammations, exulcerations, cancer, gangrene, tabes, ſtiffneſs, immobility, or the like.

With regard to an external ſcirrhus, when it is of a long ſtanding, and the patient infirm, Heiſter is of opinion that it is better to abſtain entirely from any attempt to cure it, particularly if it is in the breaſts of women, for fear the diſeaſed part ſhould become apparently cancerous. On the other hand, when the ſcirrhus is but newly formed, attended with no vehement pain or hardneſs, and when the patient is otherwiſe of a ſound habit of body, external and internal remedies may be uſed to ſet the confined fluids at liberty. The internal remedies which are found principally ſerviceable in anſwering this intention, are the decoction of the woods, digeſtive tinctures or eſſences, and mild mercurials, giving between whiles relaxing medicines to reſolve the inſpiſſated humours. With regard to external reſolvents, plaſters claim the firſt place, ſuch as are made with the warm gums, as gum ammoniac, galbanum, opopanax, ſagapenum, &c. which may be applied alone or mixed together; the next place is held by cataplaſms: ſome highly recommend acid vapours in this caſe, and to receive the ſteam of boiling vinegar upon the diſeaſed part: others ſet ſulphur on the fire, and hold the part over the fume: others, again, are fond of fumigations of cinnabar; but mercurial medicines perform wonders in this caſe. But if all medicines ſhould prove unſucceſsful, and the ſcirrhus is free and moveable, and its ſituation threatens no great danger from the neighbouring veſſels, and that the ſtrength of the patient will be ſufficient to undergo the operation, to prevent the caſe from turning cancerous, it muſt be cut out with a knife, after which the wound muſt be dreſſed with the linimentum arcei, or any other vulnerary medicine, and healed as other wounds. See the article WOUND.

For the methods of preventing the part from turning cancerous, ſee the article CANCER.

When this diſorder ſeizes the internal parts, and the ſeveral ſymptoms cannot be diſcovered by the ſenſes, in that caſe the effects of a ſcirrhus are only capable of guiding the phyſician's judgment and directing his practice: but obſcure caſes of this nature are illuſtrated by a conſideration of the following circumſtances. If the cauſe pre-diſpoſing to the generation of a ſcirrhus, is an atrabilious ſpiſſitude of the humours ariſing from long protracted uſe of auſtere, terreſtrial and coarſe aliments without violent exerciſe, or from a long continued influence of paſſion, eſpecially grief; and if, at the ſame time, the efficient cauſe is a contuſion; if an inflammation, is neither reſolved nor changed into a ſuppuration; if the uſual diſcharge of the menſes, or hæmorrhoides, is ſuppreſſed; or if the taint is hereditary, we may juſtly from ſuch cauſes dread an internal ſchirrhus. When after a mature conſideration of all circumſtances, it is probable that a ſcirrhus is capable of reſolution, emollients which relax the veſſels, and reſolvents which, without exciting a great commotion, fuſe the concreted humours, are the only medicines to be uſed. Aretæus affirms, that in order to remove a ſcirrhus, or hardneſs of the ſpleen, we are to uſe medicines as hot as fire. In a recent ſcirrhus of the liver, Junker directs that the bowels be cleanſed and relaxed

fixed by a clyſter made of a decoction of mallows, camomile-flowers, mullein, and fennel-ſeed. After this, bleeding in the foot is to be ordered, and then the nitrous and other reſolvent medicines are to be given, ſuch as tartar of vitriol and the like. After this, medicated wines ſhould be given as the common drink, prepared with byrony and arum-roots, centaury, hyſſop, and maidenhair-leaves, ſaſſafras, ſenna, black hellebore, and rhubarb: and externally, plaſters of the reſolvent and ſtrengthening kinds are to be applied. It is ſaid that no internal medicine is more efficacious than vinegar ſaturated with an highly pure alkaline ſalt; or, if to a pint of rheniſh-wine we add half an ounce of the ſalt of carduus benedictus, of the ſtalks of beans, or ſome ſuch ſubſtance, of which mixture the patient is to take half an ounce three or four times a day.

The efficacy of quickſilver in removing obſtructions is univerſally acknowledged, and both the external and internal uſe of it has often greatly contributed to the cure of a benign and incipient ſcirrhus; for when it has acquired a ſtony hardneſs, and begins to be malignant, no relief can be expected from the ſtrongeſt mercurial preparations, nor from a ſalivation excited by quickſilver, but all the ſymptoms are rather encreaſed by theſe means; and in conſequence of the increaſed motion of the humours, the ſcirrhus is the ſooner changed into a cancer: and after all directions for the treatment, it is to be acknowledged that an obdurate and inveterate ſcirrhus admits of no remedy.

SCISSARS, a well known inſtrument for cutting any thing aſunder. See the article FORCEPS.

SCITE, or SITE. See SITE.

SCIURUS, the SQUIRREL. See the article SQUIRREL.

SCLAREA, in botany, the name by which Tournefort calls ſeveral ſpecies of ſalvia, or ſage. See the article SAGE.

SCLAVONIA, a province ſubject to the houſe of Auſtria, and bounded on the north-eaſt by the rivers Drave and Danube, which ſeparate it from Hungary; being about two hundred miles long, and ſixty broad.

It takes its name from the Sclavi, an antient people of european Scythia; from whom is likewiſe derived the ſclavonic language, which is ſaid to be the moſt extenſive language in the world, except the arabic; as being the common mother of the ruſſian, hungarian, poliſh, bulgarian, carinthian, bohemian, *&c.* languages.

SCLERANTHUS, KNAWEL, in botany, a genus of the *decandria-digynia* claſs of plants, without any flower-petals: the fruit is an oval capſule, contained in the baſe of the cup, which is cloſed at the neck; and the ſeeds are two, convex on one ſide and plane on the other.

The hoary-perennial-knawel is the plant, at the roots of which is found the coccus polonicus, a very valuable ſcarlet dye. See COCCUS and SCARLET.

SCLEROPHTHALMIA, in medicine, a ſpecies of ophthalmia, wherein the eye is dry and inflamed, as are alſo the eyebrows. See OPHTHALMIA.

SCLEROTICA, in anatomy, one of the tunics, or coats, of the eye: it is hard, opake, and extended from the cornea to the optic nerve; its forepart is tranſparent, and called the cornea. See the article EYE and CORNEA.

SCLEROTICS, medicines proper to harden and conſolidate the fleſh of the parts to which they are applied; as purſlain, houſe-leek, flea-wort, garden-nightſhade, *&c.*

SCOLOPAX, the WOOD-COCK, in ornithology, a ſpecies of numenius, with a black line on each ſide the head: it is a very beautiful as well as delicate bird, ſomewhat ſmaller than the partridge; the upper part of its body being of a mixed colour, mottled with black, grey, and a reddiſh-brown: the breaſt and belly are a pale-grey, with little tranſverſe lines of a bright brown: the upper part of the throat is of a whitiſh-yellow, and the hinder part of the head chiefly black, with a few tranſverſe lines of brown on it: the male is ſomewhat darker than the female, in its general colouring. See NUMENIUS.

SCOLOPENDRA, in zoology, an inſect with a very ſlender and long body, and furniſhed with a vaſt number of legs.

According to Dale, it is ſometimes uſed as a depilatory boiled in wine.

SCOLYMUS, in botany, a genus of the *ſyngeneſia-polygamia-æqualis* claſs of plants, with a paleaceous receptacle, and imbricated cup, and no down: the flower is compoſed of a number of ſemifloſcules, each placed on an embryo-ſeed.

SCOMBER, in ichthyology, a genus of the acanthopterygious order of fiſhes, the tail of which is very much forked, ſo as to repreſent the figure of a creſcent: there are ſeven officles in the branchioſtege-membrane, on each ſide; the uppermoſt of which is covered by the operculum of the gills. This genus, beſides the common mackrel, comprehends the tunny, the horſe-mackrel, and ſeveral other ſpecies. See MACKREL, TUNNY, &c.

SCONCE, in fortification, a ſmall field-fort, built for the defence of ſome paſs, or other poſt. See FORT.

SCONE, or SCOON, a town of Scotland, near Perth, remarkable for being the place where the kings of Scotland were crowned.

SCOPARIA, in botany, a ſpecies of plantain. See the article PLANTAIN.

SCOPER, or SCUPER-HOLES, in a ſhip, are holes made through the ſides, cloſe to the deck, to carry off the water that comes from the pump. Theſe holes, in the lower deck, have round leathers nailed over them to keep the ſea-water from coming up into the ſhip; theſe are called ſcoper-leathers, and the ſhort nails with broad heads, which faſten theſe leathers down, are called ſcoper-nails.

SCOPS, in ornithology, an extremely elegant ſpecies of owl, about the ſize of a field-fare, with the head aurited by two ſingle feathers.

SCORBUTUS, the SCURVY, in medicine. See the article SCURVY.

SCORDIUM, WATER-GERMANDER, in in botany, is comprehended by Linnæus among the teucriums. See TEUCRIUM. It is celebrated for its ſudorific and alexipharmic virtues, and is accordingly preſcribed in malignant diſorders: but it is never uſed alone, being only kept in the ſhops as an ingredient of the confectio Fracaſtorii, which takes its name of diaſcordium from it. See DIASCORDIUM.

SCORE is ſometimes uſed to denote the number twenty.

SCORIA, or DROSS, among metallurgiſts, is the recrements of metals in fuſion; or, more determinately ſpeaking, is that maſs which is produced by melting metals and ores, and when cold is brittle, and not diſſoluble in water; being properly a kind of glaſs.

Some authors call by this name that ſaline maſs which is produced by melting ores and metals together with ſaline and reducing fluxes. But the word *ſcoria* is not properly to be underſtood of all this maſs, but only of the vitrified particles which are lodged between, and adhere to the ſmall maſſes of the ſalts, and which may be ſeparated from them by water. See the next article.

SCORIFICATION, in metallurgy, is the art of reducing a body, either entirely, or in part, into ſcoria.

It is uſed by metallurgiſts, in order that any metal, impriſoned in any ſolid body, may, on account of its weight, deſcend and ſeparate itſelf therefrom,; and finally, if that be required, be either wholly or in part converted into ſcoria. All fixed bodies are ſubject to this alteration, not totally excepting even gold and ſilver. There are alſo, among the volatile bodies, ſome that may be fixed, and which aſſume the name of ſcoriæ, by adding fixed bodies to them.

It is often proper to make this ſcorification in a veſſel that may abſorb the ſcoriæ, and retain only the metallic part of the maſs under trial. In this caſe the operation is called coppelling; and veſſels made of aſhes, called teſts and coppels, ſerve for this purpoſe. It is evident, in theſe proceſſes, that a great attenuation of the ſcoriæ is neceſſary, that they may be able to paſs through the veſſel; nor is there any fitter body to promote this operation than lead, which, by its undergoing itſelf a like attenuation in the fire, diſpoſes other bodies to be reduced into a ſubtle ſcoria for the ſame attenuation. See COPPEL and COPPELLING.

SCORODONIÆ SPECIES, in botany, a ſpecies of verbena. See VERBENA.

SCORODOPRASUM, a name uſed by Micheli for a ſpecies of porrum. See the article PORRUM.

SCORPÆNA, in ichthyology, a genus of the acanthopterygious order of fiſhes, the characters of which are theſe: the branchioſtege-membrane, on each ſide, contains ſeven bones: the head is large and very prickly: there is only one back-fin, and that is lower in the middle than elſewhere: the body grows ſmall towards the tail: the eyes are placed near one another, and are covered with the common ſkin: there are teeth in the jaws, palate, and fauces; and the appendices to the pylorus are eight or nine.

There are only two ſpecies of this genus, *viz.* the ſcorpæna with pinnules at the eyes and noſtrils; which very much reſembles the common pearch, and is alſo called ſcorpio, and ſcorpius minor; and the red ſcorpæna, with numerous cirri, which is thrice the ſize of the former ſpecies.

SCORPIO, the SCORPION. See SCORPION.

SCORPIOIDES, in botany, the ſame with ſcorpiurus. See SCORPIURUS.

SCORPION, *ſcorpio*, in zoology, a genus of wingleſs inſects, the body of which is of an oval figure: the tail is long and ſlender, and the whole body covered with a firm and ſomewhat hard ſkin: the eyes are eight in number, two of which are placed contiguous, and ſix ſide-ways: the legs are eight; and there are alſo a pair of claws at the head, and a pointed weapon at the extremity of the tail. See plate CCXL. fig. 4. n° 3. which repreſents the great yellowiſh barbary ſcorpion, with eight denticulations; and when full grown, meaſures ſix or ſeven inches in length: there are ſeveral other ſpecies.

SCORPION, *ſcorpio*, in aſtronomy, the eighth ſign of the zodiac, denoted by the character ♏. See the articles SIGN and ZODIAC.

The ſtars in the conſtellation ſcorpio, in Ptolemy's catalogue, are twenty: in Tycho's ten: and in Mr. Flamſteed's forty-nine.

SCORPION, in the antient art of war, an engine chiefly uſed in the defence of the walls of fortified places, by throwing arrows, fire-balls, or great ſtones. See plate CCXL. where fig. 4. n° 1. repreſents one of theſe machines charged, and n° 2. one in its natural ſituation; the point A of the longeſt brachium, A C, is kept uppermoſt by the boxes of ſtones B B: hence, in order to charge it, the point A being brought down by the rope R R, and loop *a*, drawn by means of the wheel W, and pinion at I, round the rollers L M, is detained by the pin H H. Then the loop *a* being taken off from A, and the ſling S charged with the ball or ſtone T, the ſcorpion is ready to be diſcharged; which is done by a ſmart blow of an hammer on the end of the pin H H, or by ſuddenly pulling it out by a rope; for then the point A riſes with great velocity, and one of the loops of the ſling ſlipping off, the ſtone T flies out, as repreſented in n° 2. which is another ſcorpion, differing a little from that repreſented in n° 1; the diſcharging end, A, being nearer to the axis of motion, D D, in the former than in the latter: in both, the ſcorpion turns upon the pivot C; as the whole frame H I turns round the upright ſhaft C *c*, that the machine may be directed any way. The hook H, in n° 2. does the office of the pin H in n° 1.

It appears, from Cæſar's Commentaries, that the Romans had great numbers of ſcorpions in their camps: but however powerful theſe machines were, and however numerous, yet they are not to be compared with a battery of cannon, either for force or expedition.

Thoſe who deſire a more particular account of this machine, may conſult Deſaguliers's Experim. Phil. vol. i. p. 72 and 73.

SCORPIURUS, ROUGH-CATERPILLARS, in botany, a genus of the *diadelphia-decandria* claſs of plants, with a papilionaceous flower; and its fruit is a contorted pod, ſomewhat reſembling a caterpillar.

This genus comprehends the ſcorpioides and campoides of authors.

SCORPIURUS is alſo uſed by ſome for the myoſotis. See MYOSOTIS.

SCORZONERA, VIPER'S-GRASS, in botany, a genus of the *ſyngeneſia-polygamia-æqualis* claſs of plants, with a compound imbricated flower, made up of a great many monopetalous, ligulated, and quinquedentated ſmall ones: the ſtamina are five very ſhort capillary filaments: there is no pericarpium, except the imbricated cup, which becomes connivent, and contains a ſingle oblong and ſtriated ſeed after each leſſer flower: the ſeeds are crowned with a plumoſe down. See plate CCXLII. fig. 2.

The roots of this plant abound with a milky juice, of a bitteriſh ſubacrid taſte; and hence may be of ſome ſervice for ſtrengthening the tone of the viſcera, and promoting the fluid ſecretions. They were formerly celebrated as alexipharmics, and for expelling the meaſles and ſmall-pox; but have, of late, almoſt loſt their character in theſe intentions.

SCOTLAND, excluſive of the iſlands, is ſituated between 1° and 6° weſt long. and between 54° 30′ and 58° 30′ north lat. being about three hundred miles long, from north to ſouth, and from fifty to one hundred and fifty miles broad, from eaſt to weſt.

Since the union with England, Scotland is divided into thirty three ſhires, or counties, which altogether ſend only thirty knights to parliament, by reaſon the ſhires of Bute and Cathneſs chooſe only alternately, or every other parliament, in their turns; as do thoſe of Cromartie and Nairn, Clacmannan and Kinroſs.

The

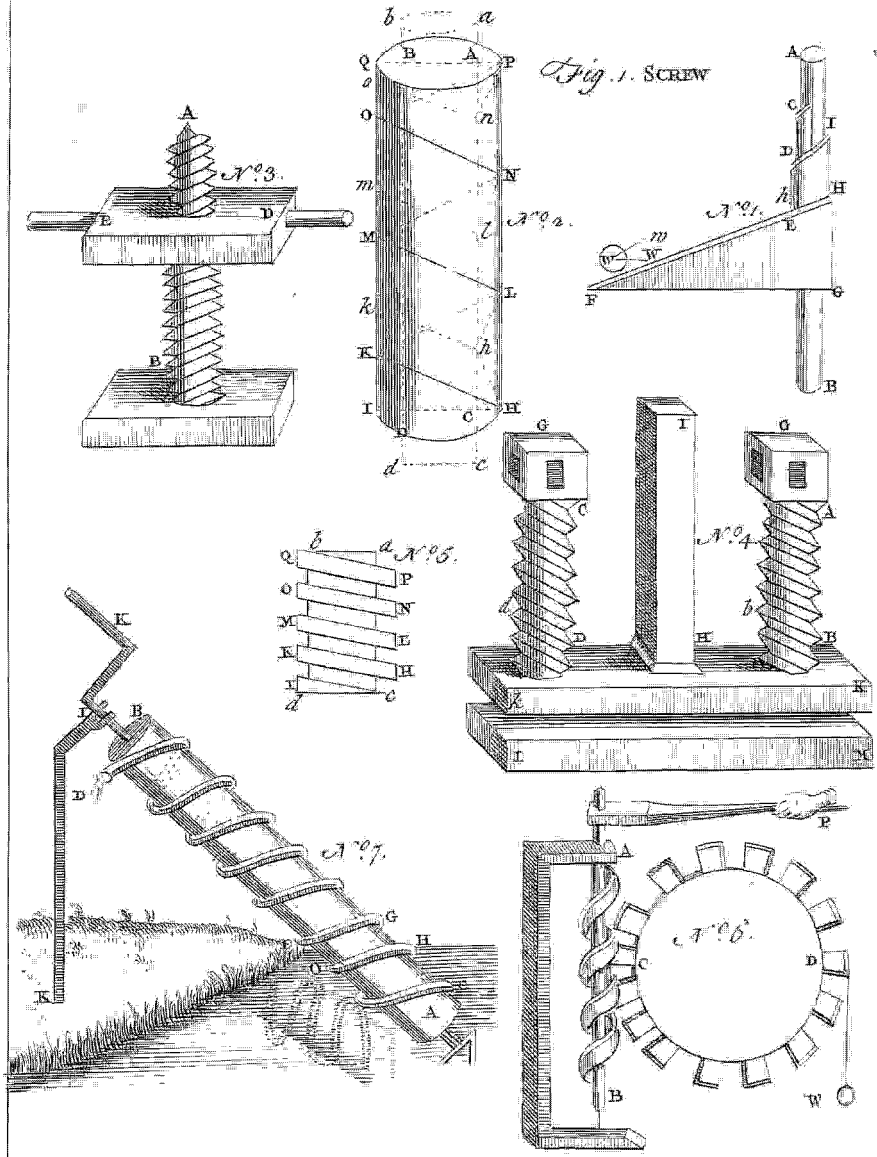


Fig. 1. SCREW
N°1.
N°2.
N°3.
N°4.
N°5.
N°6.
N°7.
A
B
C
D
E
F
G
H
I
K
L
M
N
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a
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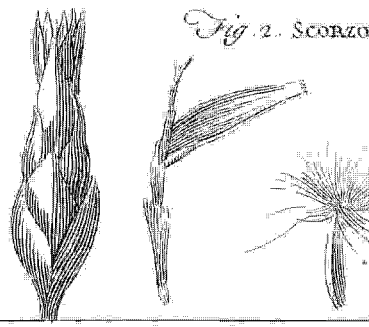
Fig. 2. SCORZONERA

The royal boroughs of Scotland are ſixty-five, but ſo claſſed as to ſend only fifteen burgeſſes to parliament.

New SCOTLAND, *Nova Scotia*, one of the britiſh colonies in north America, is ſituated between 62° and 72° weſt long. and between 43° and 51° north lat. being bounded by the river of St. Laurence on the north and north-weſt; by the bay of St. Laurence, and the Atlantic Ocean on the eaſt; by the ſame ocean and New-England on the ſouth; and by french Canada on the weſt.

SCREW, or SCRUE, *cochlea*, one of the five mechanical powers. A ſcrew is a cylinder cut into ſeveral concave ſurfaces, or rather a channel or groove made in a cylinder, by carrying on two ſpiral planes the whole length of the ſcrew, in ſuch a manner, that they may be always equally inclined to the axis of the cylinder in their whole progreſs, and alſo always inclined to the baſe of it in the ſame angle.

The ſcrew may alſo be conſidered as a wedge carried round a cylinder, which in that caſe is called the arbor of the ſcrew; the wedge, ſo carried on, making what is called the thread of the ſcrew, as may be ſeen in plate CCXLII. fig. 1. n° 1, 2, 3, 4, and 5. The arbor of the ſcrew being A B in n° 1. and *a c b d* in n° 2. as if the cylinder A C B D was inſcribed within the ſcrew. Here, we may ſee the manner how a ſcrew is made; for if it be cut out of the cylinder P H I Q, then H K L M N O P is a ſpiral line going about the cylinder, making the prominent part to be left of the ſaid cylinder; and *h k l m n o*, the line marking the depth to which the ſcrew is to be cut, ſuppoſing the ſame line to go round the inner cylinder or arbor A B C D, though not expreſſed here, to avoid confuſion; and then *h* L *l* N *n*, &c. will repreſent the prominent part or thread of the ſcrew. Now, if inſtead of cutting the hollows H *h* L, L *l* N, N *n* P, &c. into the cylinder P H I Q, a continued wedge be fixed to a ſmaller cylinder as A C B D, or rather *a c b d*, the ſame kind of ſcrew will be made, and *a b c d* will be the arbor of that ſcrew. Sometimes the moſt prominent part of the thread, as L N, &c. is not ſharp but flat, and then the thread is called a ſquare thread, as in (n° 5.) which repreſents the ſection of ſuch a ſcrew. This ſort of thread is not uſed in wood, but in iron, and in other metals; it is of good ſervice, being commonly more durable, and raiſing the weight with more eaſe than the ſharp thread.

Force of the SCREW. To make an eſtimate of the force of the ſcrew, which may be compared either to an inclined plane, or to a wedge, according as its arbor does or does not advance in a progreſſive motion whilſt it turns round its axis to raiſe or ſtop a weight, or to preſs bodies together, which are the ſeveral uſes of a ſcrew, let us take a flexible wedge, as, for example, one of paper, and coil it round a cylinder, (*ibid.* n° 1.) as is repreſented in the figure, where A B is the arbor, C I D one thread or helix, D H E another, and E T G part of the wedge left to ſhew the proportion between the power that turns the ſcrew and the weight W.

If the weight is puſhed up the wedge, (or, which is the ſame thing, raiſed perpendicularly by the wedge ſlipping under it) from F to H in the direction W *w*, then will H G be the velocity of the weight, and G T the velocity of the power, which is the caſe of the inclined plane becoming a wedge; and this will be the analogy for the ſcrew thus acting.

As a circle whoſe diameter is H *h*: to H I the diſtance of two threads :: (or as the baſe F G: to the perpendicular H G::) ſo is the weight: to the power applied to the arbor at A, to raiſe a weight up the thread H D I C.

N. B. We ſuppoſe the diameter of the arbor at A and of the ſcrew at H nearly equal.

This is the caſe of n° 4. where the moveable plank D K is carried down, by turning round the heads G G of the ſcrews A B and C D, in order to preſs ſtrongly the bodies placed between the planks D K and M L, whilſt the piece H I, fixed on the upper plank, is either guided through an hole, or, being only looked at, ſerves to ſhew whether the plank K D be brought down horizontally, as the ſcrews are turned. When long levers are thruſt into the ſquare holes at the heads of the ſcrews, the force of the ſcrew is much increaſed, and then the weight will be to the power:: as the circumference of the circle deſcribed by that part of the lever to which the hand is applied: to the diſtance between two threads. Wherefore, as the circumference of the circle is to the diſtance of two thirds of an endleſs ſcrew:: ſo is the reſiſtance of the teeth of the wheel: to the power applied to the handle.

Archimedes's SCREW, in hydraulics, a kind of ſpiral pump, for raiſing water, ſo called from its inventor Archimedes.

It conſiſts of a long cylinder, with a hollow pipe, tube, or groove coiled round it, as repreſented in *ibid.* n° 7. where AB repreſents the cylinder, and CD the tube open at each end. It is placed in an oblique poſition to the horizon, with the lower end in the water to be pumped away, the other end being ſupported on the lower part of the winch IK, by which the ſcrew and cylinder are turned round.

As ſoon as the ſcrew is immerſed in the water, it immediately riſes therein by the orifice C to the level of the ſurface of the water EF; and if the point of the helix or ſpiral, which in the beginning of the motion is coincident with the ſurface of the water, happens not to be on the lower ſide of the cylinder, the water will upon the motion of the ſcrew, move on in the ſpiral, till it comes to the point which is on the other ſide, and coincident with the ſurface of the water; when it is arrived at that point, which ſuppoſe at O, it cannot afterwards poſſeſs any other part of the ſpiral than that which is upon the loweſt part of the cylinder; for it cannot move from O towards H or G, becauſe they are ſituated higher above the horizon; and ſince this will conſtantly be the caſe, after the water in the ſpiral has attained the point O, it is plain that it muſt always be on the under ſide of the cylinder.

But becauſe the cylinder is in motion, every part of the ſpiral ſcrew, from O to D, will, by degrees, ſucceed to the ſaid under part of the cylinder; the water, therefore, in the ſpiral, muſt ſucceed to every part thereof, from O to D, as it comes on the lower ſide; that is, it muſt aſcend on the lower part of the cylinder through all the length of the pipe, till it comes to the orifice D, where it will run out, as having nothing farther to ſupport it. Hence it appears how much theſe gentlemen are miſtaken who, affecting the wonderful, ſay, 'That the water 'aſcends by deſcending;' whereas, if they would have made the moſt of the wonder, they might have truly ſaid, 'That the water aſcends becauſe it can-'not aſcend,' *i.e.* that it aſcends one way, becauſe it cannot aſcend another; but then the wonder is loſt.

Endleſs or perpetual-SCREW, one ſo fitted in a compound machine, as to turn a dented wheel; ſo called, becauſe it may be turned for ever without coming to an end: *ibid.* n° 6.

If in the endleſs, or perpetual-ſcrew, AB, whoſe threads take the teeth of the wheel CD, you take the diſtance of two threads, according to the length of the axis AB; or the diſtance of two teeth in the wheel CD, in the direction of the circumference; and if a weight, W, act at the circumference of the wheel: then, if the power D be to the weight W, as that diſtance of the teeth or threads, to the length deſcribed by the power P in one revolution, the power and weight will be in æquilibrio; becauſe in one revolution of P, the wheel DC, with the weight W, has moved only the diſtance of one tooth.

SCRIBE, an officer among the Jews whoſe buſineſs was to write; of which there were three kinds: the firſt and principal of which were the ſcribes of the law, whoſe office was to write and interpret ſcripture; theſe were in great credit and eſteem among the Jews, and had even the precedency of the prieſts and ſacrificers, and their deciſions were received with almoſt the ſame reſpect as the law of God itſelf: the ſecond kind, properly called ſcribes of the people, were a ſort of magiſtrates: and the third were public notaries, or ſecretaries of the council; which were the leaſt conſiderable.

The ſcribes, among the Romans, wrote out decrees, or acts, and made out authentic copies of them.

SCRIBING, in joinery, *&c.* is a term uſed when one ſide of a piece of ſtuff is to be fitted to another that is irregular. In order to make theſe join cloſe all the way they ſcribe it; that is, they lay the piece to be ſcribed cloſe to the other they intend to ſcribe it to, and opening their compaſſes to the wideſt diſtance theſe two pieces ſtand from each other, they bear the point of one of the legs againſt the ſide they intend to ſcribe to, and with the other point draw a line on the ſtuff to be ſcribed. Thus they form a line on the irregular piece parallel to the edge of the regular one; and if the ſtuff be cut exactly to the line, when theſe pieces are put together they will ſeem a joint.

SCRIPTURE, an appellation given, by way of eminence, to the ſacred and inſpired writings of the Bible. See BIBLE, CANONICAL, *&c.*

SCRIVAN, a port-town of the province of Darien, in Terra Firma, fifty miles eaſt of Porto Bello.

SCROPHULA, the KING'S EVIL, in medicine, a hard glandulous tumour, uſually of the ſame colour with the ſkin, ſeated principally in the ſides of the neck, behind the ears, and under the chin: but though the principal ſeat of this diſeaſe is in the ſides of the neck, ſcarcely any part of the body is exempted from it. The humour ſometimes falls on the lungs, and brings on a pulmonary conſumption; and it is a dreadful circumſtance, that this diſorder is tranſmitted from parents to their children, by way of inheritance. As to the cure of this ſtubborn diſeaſe, ſays Dr. Mead, it is to be attempted by bleeding, purging and ſuch medicines as are moſt proper for correcting the viſcidity, ſaltneſs, and acrimony of the humours. Of cathartics, the beſt is dulcified mercury ſix times ſublimed, which ſhould be joined with rhubarb, for children; but to adults it may be given alone, with a gentle purging draught ſome hours after it. The next to this in virtue is jalap: and our purging waters are alſo uſeful, as they ſcour the glands and open the body at the ſame time. In fine, a pill compoſed of mercury ſix times ſublimed, and precipitated ſulphur of antimony, each one grain; of aloes, three or four grains; made up with the ſyrup of balſam, and taken every night, will be found ſerviceable, not only in this diſeaſe, but in others ariſing from viſcid humours.

For correcting this pravity of blood and humours, the following powder may be taken twice a day, with three or four glaſſes of the leſs compound lime-water: take of burnt ſponge, one ſcruple; of purified nitre, coralline, and white ſugar, each ten grains; mix them together: and if the patient happen to be emaciated, equal quantities of milk may be mixed with the water. The expreſſed juice of millepedes will alſo be of ſome ſervice, on account of their diuretic quality. Iſſues likewiſe will be beneficial, to drain off the viſcous humour; and a change of aliment is often attended with good effects.

As to the patient's diet, which ought not to be neglected, let him feed on fleſh of eaſy digeſtion, and abſtain from all ſalt and ſmoke-dried meat and high-ſeaſoned things; and particularly from pork, hare, cheeſe, and in general from all things that are hard of digeſtion. Let him drink river-water, and that boiled; but ſtagnating or ſnow-water never.

For the manner of treating ſcrophulous tumours by outward applications, ſee the article SCHIRRUS.

SCROPHULARIA, FIGWORT, in botany, a genus of the *didynamia-angioſpermia* claſs of plants, with a monopetalous flower, divided into five ſegments at the limb: the fruit is a roundiſh bilocular capſule, containing a great many ſmall ſeeds. The root of this plant is eſteemed externally, as a remedy for the piles, and for the king's evil-ſores: it is generally made into an ointment for theſe purpoſes; but ſome give it alſo internally, in diet-drinks.

SCROTUM, in anatomy, the capſula or bag in which the teſticles are contained, and which hangs down below the penis. See the article TESTICLE.

The ſcrotum is compoſed of a cuticula, cutis, and a muſculous membrane called the dartus, by means of which it is contracted. It has in the midſt a ſeptum, formed by a duplicature of the dartus, by which it is divided into two cells, and which anſwers to a longitudinal ſuture, by which it is externally divided into two ſides, a right and a left. It has its veſſels from the hypogaſtrics, and its nerves from the os ſacrum.

Its uſe is to contain, to cheriſh, and defend the teſticles.

SCROTUM CORDIS, the ſame with pericardium. See PERICARDIUM.

SCROWLS, or SCROLLS, in architecture, the ſame with volutes. See VOLUTE.

SCRUPLE, a weight equal to the third part of a dram, or to twenty grains. See the article WEIGHTS.

Among goldſmiths it is equal to twenty-four grains.

The ſcruples of the moon, *&c.* eclipſed, are the parts of the moon's diameter immerſed in the ſhadow, expreſſed in the ſame meaſure wherein the apparent diameter of the moon is expreſſed.

The ſcruples of half duration are an arch of the moon's orbit, which the center of the moon deſcribes, from the beginning of an eclipſe to its middle. Scruples of immerſion, are an arch which the moon's center deſcribes, from the beginning of the eclipſe to its middle. And ſcruples of emerſion, are an arch of the moon's orbit, deſcribed by her center from the time of the emerſion of her limb to the end of the eclipſe. See ECLIPSE.

SCRUTINY,

SCRUTINY, a ſtrict examination of the ſeveral votes taken at an election, in order to diſcover unqualified voters. See the article ELECTION.

SCULPTURE, an art by which, in taking away, or adding to matter, all ſorts of figures are formed by the hand, either in ſtone, wood, wax, or metal. In its full latitude it ſignifies both the art of working in creux, properly called engraving, and of working in relievo, which is more ſtrictly called ſculpture. See the articles ENGRAVING and RELIEVO.

The firſt works in ſculpture were with clay, not only in making ſtatues, but in forming models; and to this day a ſculptor never undertakes any thing conſiderable, without forming a model, either in clay or wax. In making figures of theſe materials, they begin and finiſh their work with their hands, uſing only three or four pieces of wood, which are roundiſh at one end, and at the other flat, with a ſort of claws and teeth, which are to ſmooth and ſcratch the work. For waxen models, to every pound of wax add half a pound colophony; ſome add turpentine, and melt it together with oil of olives; more or leſs of the latter being uſed as they would have the matter harder or ſofter: ſome alſo add a little vermillion, to give it a colour: this is wrought and moulded with the fingers like clay. See MOULDING.

For ſculpture in wood, which we properly call carving, the firſt thing required is to chooſe wood proper for the work the ſculptor is to perform. If it be any thing large, and that requires a great deal of ſtrength and ſolidity, the hardeſt and moſt durable wood is to be choſen; and for ſmaller works and ornaments, the ſofter wood is uſed; but it muſt be ſuch, however, as is firm and cloſe: for a large work, though it be only a ſingle figure, it is better to make uſe of ſeveral pieces of wood, or bits of board, glued together, than of one whole piece, which is more liable to crack; for a thick piece of wood may not be dried to the heart, however it may appear on the outſide.

Carving is performed with a great variety of chiſſels and other tools, for paring, ſcooping, rounding, &c. the ſeveral parts of the work.

In ſculpture in marble and other ſtone, the firſt thing to be done is to ſaw out a block of marble, of the bigneſs of the work to be performed; and this being done, the ſuperfluities are to be taken off by a ſtubbed point and a heavy mallet; thus, bringing it near the meaſures required, the ſculptor reduces it ſtill nearer with a finer tool, called a dog's tooth, it having two points, but one not ſo ſharp as the other. After this he makes uſe of his gradine, which is a flat cutting tool, with three teeth; he then takes off, with a ſmooth chiſſel, the ſcratches the gradine left on the marble, and uſes it with dexterity and delicacy, to give ſoftneſs and tenderneſs to his figure; till at length, taking raſps of different degrees of fineneſs, the work is gradually rendered fit for poliſhing. To poliſh the work, the ſculptor uſes pumice-ſtone and ſmalt, then he goes over it with tripoli; and when he would give it more luſtre, rubs it with leather and ſtraw-aſhes. There are ſeveral other tools uſed by ſculptors, adapted to the different parts of the work, and the nature of the ſtone they make uſe of.

As the models of clay ſhrink as they grow dry, whenever ſculptors undertake a conſiderable piece of work, they only uſe the model for making a mould of plaiſter or ſtucco, in which is formed a figure of the ſame matter, which ſerves them thenceforth for a model, and by which they adjuſt all their meaſures and proportions. To proceed the more regularly, on the head of the model they place an immoveable circle divided into degrees, with a moveable rule or index, fixed in the center of the circle, and divided alſo into equal parts: from the end of the rule hangs a line with a plummet, which ſerves to take all the points, to be transferred thence to the block of marble, from whoſe top hangs another plummet, like that of the model. But there are ſome excellent ſculptors, who diſapprove of this method; urging, that the ſmalleſt motion of the model changes their meaſures, for which reaſon they chooſe rather to take all their meaſures with the compaſſes. See the articles POLISHING, &c.

SCUM properly denotes the impurities, which a liquor, by boiling, caſts up to the ſurface. See CLARIFICATION.

The term ſcum is alſo uſed for what is more properly called the ſcoria of metals. See the article SCORIA.

In this laſt ſenſe, the ſcum of lead is a ſort of ſmalt, of various colours; and the ſcum of ſilver is what we commonly call litharge. See SMALT and LITHARGE.

SCUPER, or SCOPER-HOLES, in a ſhip. See the article SCOPER.

SCURRA,

SCURRA, in ornithology, the name by which the antients called the jackdaw.

SCURVY, *ſcorbutus*, in medicine, Dr. Mead obſerves, is the name given by medical writers to a diſeaſe ſo various and different in appearance, that it does not ſeem to be one and the ſame diſtemper.

Boerhaave obſerves, that the ſcurvy chiefly affects the inhabitants of cold northern countries, eſpecially thoſe who live in marſhy, low, fat, and moiſt ſoils, near ſtagnating waters, whether freſh or ſalt. Thoſe who live idle ſedentary lives are moſt ſubject, chiefly in the winter-time, to the attacks of this diſtemper; as alſo thoſe feeding upon ſalted and ſmoke-dried fleſh, or fiſh, ſea-biſcuit, ſtinking water, unfermented farinaceous vegetables, peas, beans, ſharp, ſalt, old cheeſe; likewiſe thoſe who are ſubject to melancholic, maniacal, hyſteric, or hypochondriacal diſorders; or thoſe who have taken large quantities of the peruvian bark without proper evacuations. Dr. Pringle conſiders the ſcurvy as ariſing from a putrid cauſe only; and thinks that the ſpecies of that malady, ſaid to be owing to an acid, is ſo far from being ſo, that it were to be wiſhed this ſuppoſed ſpecies of ſcurvy had not been denominated of this diſtemper, and the more ſo, as he apprehends that in the countries moſt liable to the true ſcurvy, an acid is rarely to be blamed. He thinks, that if the acrimony of the fluids is great and ſudden, a fever or flux will enſue; but if the accumulation is ſo ſlow, that the body grows habituated to the putrefaction, a ſcurvy prevails; this is the caſe in long voyages, occaſioned by corrupted air and proviſions, on board unventilated ſhips, in marſhy countries from ſimilar cauſes, and in a leſſer degree in all northerly climates in moſt ſituations, from a want of due perſpiration of what is putrid, and eſpecially with the uſe of ſalted meats.

The ſcurvy, according to Sydenham, is known by a ſpontaneous wearineſs, a heavineſs of the body, difficulty of breathing eſpecially after motion, rottenneſs of the gums, a ſtinking breath, frequent bleeding of the noſe, difficulty of walking, ſometimes a ſwelling and ſometimes a falling away of the legs, in which there are always livid, plumbeous, yellow, or violet-coloured ſpots, and the colour of the face is generally of a pale tawney.

Boerhaave obſerves, that the firſt ſtate of this diſeaſe begins with unuſual lazineſs, ſpontaneous wearineſs; the patient loves to be in a ſitting or lying poſture; there is a pain in all the muſcles, as if he was overtired, eſpecially in the legs and loins; when he awakes in the morning, all his joints and muſcles ſeem to be tired and bruiſed. In the ſecond ſtate, the gums ſwell, grow painful, hot, and itching, and bleed upon the leaſt preſſure: the roots of the teeth become bare and looſe; he feels pains in all the external and internal parts of the body, imitating diſtempers proper to the various parts. In the third ſtate, the gums at length grow putrid, with a cadaverous ſmell: when they are inflamed, blood diſtils from them, and a gangrene enſues; the looſe teeth by degrees grow yellow, black, and rotten; the ſublinguar veins become varicoſe and like rings; there are often fatal hæmorrhages, which break out from the external ſkin, without any appearance of a wound, from the lips, gums, mouth, noſe, lungs, ſtomach, liver, ſpleen, pancreas, inteſtines, womb, kidneys, *&c.* Obſtinate ulcers ariſe, which no application will cure, and are apt to turn to a gangrene; they break out in all parts of the body, but eſpecially the legs, and are attended with a ſtench; there is a kind of itch and dry ſcabs, with a dry and mild leproſy; the blood drawn from a vein is black and grumous, thick, and yet wants its due conſiſtence in the fibrous part; the ſerum is ſalt, ſharp, and abounding with a yellowiſh green mucus on the ſurface: there are gnawing rending pains, quickly ſhifting from place to place, which grow more violent in the night, affecting all the joints, bones, and viſcera. In the fourth ſtate there are fevers of various kinds, which bring on an atrophy; ſometimes diarrhæas, dyſenteries, or violent ſtranguries; as alſo faintings and mortal anxieties, a dropſy, conſumption, convulſions, trembling, a palſy, contractions, black ſpots, voiding of blood upwards and downwards, a putrefaction and conſumption of the liver, ſpleen, pancreas, meſentery: and now the contagion ſpreads very quick.

From this account of the diſeaſe it appears, continues the laſt-mentioned author, that one part of the blood is faulty in being too thick, and the other in being too thin, with a ſalt, alkaline, or acid acrimony; wherefore, to diſcover which of the three predominates, requires the utmoſt attention, and the moſt accurate enquiry: for, in the cure of this diſ-

eaſe,

caſe, that which is thick is to be attenuated, that which is ſtagnant rendered moveable, and that which is coagulated is to be made fluid.

It ought to be laid down, ſays Hoffman, as a general rule, that the ſcurvy, the moſt virulent of all chronical diſtempers, is not to be treated with draſtic, but with the moſt mild and ſimple medicines: likewiſe the patient ſhould change the air in which the diſeaſe was formed, and remove from unhealthy places, where the air is impure, vapid, and deprived of its due elaſticity, cloudy, or impregnated with noxious exhalations, to places more ſalutary, and where the air is more pure. If his circumſtances will not admit of travelling to Italy or France for a purer air, he ſhould burn juniper-wood in his chimney, or throw amber on live coals. The patient ſhould alſo uſe exerciſe, not indulge himſelf in much ſleep, be temperate in his diet, and feed upon aliment of eaſy digeſtion. Our author ventures to affirm, that mineral waters are a univerſal remedy for the ſcurvy; but the cure is ſtill more certain, if an accurate regimen be obſerved, and the waters aſſiſted by the repeated exhibition of proper antiſcorbutic and balſamic medicines. When theſe cannot be had, pure light fountain-water, wherein hot iron has been extinguiſhed, may be ſubſtituted in their room. Beſides mineral waters, nothing is more effectual in correcting a ſcorbutic acrimony than a milk-diet, or whey, or whey impregnated with the juices of antiſcorbutic herbs, as ſcurvy-graſs, and water-creſſes. Scurvy-graſs and all the ſpecies of garden and water-creſſes, horſe-radiſh, the roots of wild-radiſh, and muſtard are juſtly looked upon as antiſcorbutics, for they induce a ſurpriſing change both in the diſordered fluids and ſolids. To theſe may be added the roots of gentian and ſuccory, the leaves of ſcordium, carduus benedictus, wormwood, the leſſer centaury, water-trefoil, or bucks-beans. Balſamics and corroboratives, as juniper-berries, the tops of fir and pine-trees, winters-bark, cortex elutheriæ, and the peruvian bark: the gums ammoniac, ſagapenum, and galbanum; and the woods of ſaſſafras, guaiacum, and aloes. Medicines which allay the pains and ſpaſms, are the fat of animals, cream, oil of ſweet almonds, ſperma ceti, caſtor, aſſa fœtida, extracts of yarrow and chamomile, diaſcordium, ſaffron, earth-worms, elk-hoof, &c. As to evacuations, bleeding ſhould be uſed with the greateſt caution; and none but the gentleſt purges ſhould be uſed, ſuch as ſena, rhubarb, or manna; alſo pills made after the manner of Becher, with depurated aloes, extract of rhubarb, bitter herbs, and temperate balſamic ingredients. The diuretics ſhould not be ſtronger than the decoction of the roots of parſley, celeri, fennel, and aſparagus. The ſafeſt diaphoretics are dulcified ſpirit of nitre, flowers of ſulphur, æthiops mineral, infuſions in the manner of tea of Paul's betony, carduus benedictus, ſcordium, and elder-flowers, diaphoretic antimony, calcined and uncalcined hartſhorn, amber, native cinnabar, cinnabar of antimony, and compound powder of crab's claws: theſe things are adapted to a cold ſcurvy. But in the hot or alcaline, ſcurvy-graſs is too hot to be adminiſtered alone; wherefore it ſhould be corrected with acids, ſuch as wood-ſorrel, the juices of citrons, oranges, barberries, and pomegranates; this ſhould be accompanied with milk-meats, almond-emulſions, barley-broths, water-gruel, chicken-broths, with endive, lettuce, ſorrel, and creſſes, at intervals. When the ſcurvy proceeds from muriatic ſalts, which happens to thoſe who live on ſmoked or high-ſalted fiſh or fleſh, then whey, copiouſly drank, produces good effects; as alſo citrons, china-oranges, and ripe fruits; whereas ſpirituous and volatile antiſcorbutics are generally detrimental. Heiſter ſays, that when there is a continual ſalt taſte in the mouth, lime-water, drank morning and evening, is a high ſpecific. The late biſhop of Cloyne ſays, that if he may truſt what trials he has been able to make, tar-water is good in the ſeveral ſorts of ſcurvy, whether alkaline, acid, or muriatic; and that he believes it to be the only medicine that cures them all, without doing hurt in any. See TAR-WATER.

In a high degree of the ſcurvy, mercurial ſalivation is looked upon by many as the only cure; which, by the vehement ſhock it gives the whole frame, and the ſenſible ſecretion it produces, may be thought to be more adequate to ſuch an effect; but the diſorder occaſioned by that violent proceſs, it is to be feared, may never be got over. See SALIVATION.

SCURVY-GRASS, *cochlearia*, in botany. See the article COCHLEARIA.

SCUTAGE was antiently a tax impoſed on ſuch as held lands, &c. by knight's ſervice, towards furniſhing the king's army;

army: hence ſcutagio habendo was a writ that lay for the king, or other lord, againſt tenants holding by knight's ſervice, to ſerve in perſon, or ſend a ſufficient man in their room, or pay a certain ſum, &c.

SCUTARET, or SCUTARI, a caſtle and ſeraglio on the eaſt ſide of the Boſphorus, oppoſite to Conſtantinople, about a mile from it.

SCUTARI, a city of european Turky, in the province of Albania, ſituated in eaſt longit. 20°, and north lat. 42° 30'.

SCUTCHEON. See ESCUTCHEON.

SCUTELLARIA, in botany, a genus of the *didynamia-gymnoſpermia* claſs of plants, the corolla whereof conſiſts of a ſingle ringent petal; the tube is very ſhort, and reflected backwards; the faux is long and compreſſed; the upper lip is concave and trifid, and the middle lacinula concave and emarginated; there is no pericarpium; the mouth of the calyx is originally open, but after the flower is fallen it becomes ſhut, with an operculum; the ſeeds are roundiſh, and four in number. This genus comprehends the caſſida of Tournefort.

This plant is recommended as good in tertian agues.

SCUTIFORME OS, in anatomy, the chief bone of the knee, called alſo patella, mola, &c. See the article PATELLA.

SCUTIFORMIS CARTILAGO, in anatomy, one of the cartilages of the larynx, the broadeſt and biggeſt of them all, called alſo thyroides. See the article LARYNX. This cartilage is of a quadrangular figure, and ſtands in the anterior part, where the pomum Adami makes its prominence, whence it is ſometimes called the anterior cartilage. It is gibbous without ſide, and hollow within; ſometimes double, chiefly in women, in whom it does not advance ſo far forward as in men.

SCUTTLES, in a ſhip, ſquare holes cut in the deck, big enough to let in the body of a man, ſerving to let people down into any room below upon occaſion, or from one deck to another. They are generally before the main-maſt, before the knight in the forecaſtle; in the gun-room, to go down to the ſtern-ſheets; in the round-houſe, to go down into the captain's cabin, when forced by the enemy in a fight aloft. There are alſo ſome ſmaller ſcuttles, which have gratings over them: and all of them have covers, that people may not fall down through them in the night.

Scuttle is alſo a name given thoſe little windows and long holes which are cut out in cabins, to let in light.

SCYTALA, in mechanics, a term uſed by ſome writers, for a kind of radius, or ſpoke, ſtanding out from the axis of a machine, as an handle or lever to turn it round and work it by.

SCYTALA LACONICA, a ſtratagem or device of the Lacedemonians, for the ſecret writing of letters to their correſpondents, ſo that if they ſhould chance to be intercepted, no body might be able to read them. To this end they had two wooden rollers or cylinders, perfectly alike and equal, one whereof was kept in the city, and another by the perſon to whom the letter was directed. For the letter, a ſkin of a very thin parchment was wrapped round the roller, and thereon was the matter written; which done, it was taken off, and ſent away to the party, who, upon putting it in the ſame manner upon his roller, found the lines and words in the very ſame diſpoſition as when they were firſt written.

SCYTHIA. The northern parts of Europe and Aſia were antiently ſo called, which afterwards obtained the name of Tartary.

SEA, *mare*, is frequently uſed for that vaſt tract of water encompaſſing the whole earth; but is more properly a part or diviſion of theſe waters, and is better defined a leſſer aſſemblage of water, which lieth before and waſheth the coaſts of ſome particular countries, from whence it is generally denominated, as the Iriſh ſea, the Mediterranean ſea, the Arabian ſea, &c.

What proportion the ſuperficies of the ſea bears to that of the land is not preciſely known, though it is ſaid to be ſomewhat more than two thirds. As the waters of the earth muſt neceſſarily riſe to the ſurface thereof, as being ſpecifically lighter than the earth, it was neceſſary there ſhould be large cavities therein for receptacles to contain them, otherwiſe they would have overſpread all the ſuperficies of the earth, and ſo have rendered it utterly uninhabitable for terreſtrial animals; for the center of the earth being the common center of gravity, and the nature of fluids being ſuch, that they equally yield to equal powers; and the power of attraction being every where equal at equal diſtances from the center, it follows, that the ſuperficial parts of the water will every where conform themſelves

to an equidiſtant ſituation from the center, and conſequently will form the ſurface of a ſphere, ſo far as they extend. Hence, that the ſea ſeems higher than the earth or land, reſults from the fallacy of viſion, whereby all objects, and the parts of land as well as ſea, the farther they are off from us, the higher they appear; the reaſon of all which is plain from optics: for it is well known, that the denſer any medium is, through which we behold objects, the greater is the refraction; or the more their images appear above the horizontal level; alſo the greater quantity of the medium the rays paſs through, the more will they be bent from their firſt direction; on both theſe accounts the appearances of things remote, and on the ſea, will be ſomewhat above the horizon, and the more ſo, as they are the more remote. See the articles GRAVITY, FLUID, EARTH, REFRACTION, &c.

With regard to the depth or profundity of the ſea, Varenius affirms, that it is in ſome places unfathomable, and in other places very various, being in certain places $\frac{1}{20}$, $\frac{1}{5}$, $\frac{45}{100}$, $1\frac{1}{10}$, $2\frac{2}{10}$, $4\frac{1}{2}$ engliſh miles, in other places deeper, and much leſs in bays than in oceans. In general, the depths of the ſea bear a great analogy to the height of mountains on the land, ſo far as is hitherto diſcovered. See the article MOUNTAIN.

M. Daſſie has been at great pains to prove that the ſea has a general motion, independent of winds and tides, and of more conſequence in navigation than is generally ſuppoſed. He affirms, that this motion is from eaſt to weſt inclining towards the north, when the ſun has paſſed the equinoctial northward, and that during the time the ſun is in the northern ſigns; but the contrary way after the ſun has paſſed the ſaid equinoctial ſouthward: adding, that when this general motion is changed, the diurnal flux is changed alſo; whence it happens that in ſeveral places the tides come in, during one part of the year, and go out during the other, as on the coaſts of Norway, in the Indies at Goa, Conchinchina, &c. where, while the ſun is in the ſummer ſigns, the ſea runs to the ſhore; and when in the winter ſigns, runs from it. On the moſt ſouthern coaſts of Tonquin and China, for the ſix ſummer months, the diurnal courſe runs from the north with the ocean; but the ſun having repaſſed the line toward the ſouth, the courſe declines alſo ſouthward.

There are two principal reaſons why the ſea doth not increaſe by means of rivers, &c. falling every where into it. The firſt is, becauſe waters return from the ſea by ſubterranean cavities and aqueducts, through various parts of the earth. Secondly, becauſe the quantity of vapours raiſed from the ſea, and falling on the land, only cauſe a circulation, but no increaſe of water. It hath been found by calculation, that in a ſummer's day there may be raiſed in vapours, from the Mediterranean ſea 528000000 tuns of water; and yet this ſea receiveth not, from all its nine great rivers, above 182700000 tuns per day, which is but a third part of what is exhauſted in vapours.

The aſcent of the ſea-water, for the formation of ſprings, by a ſubterranean circulation of its water to their ſources, has been a great objection with many, againſt the ſyſtem of their being formed of the ſea; but Dr. Plot has obſerved, that there are many ways by which the water may aſcend above its own level: 1. By the means of ſubterranean heats. 2. By filtration. 3. By the unequal height of ſeveral ſeas. 4. By the diſtance of the center of magnitude from the center of gravity in the terraqueous globe: the ſuperficies of the Pacific ſea is ſaid to be farther from the center of gravity than the top of the higheſt hill on the adverſe part of the globe. And, 5. By the help of ſtorms. The ſea-water actually aſcends above its own level, in coming into wells, whoſe bottoms lie higher than the ſurface of the ſea at high-water mark.

With regard to the ſaltneſs of the ſea-water, it is very rationally judged to ariſe from great multitudes both of mines and mountains of ſalt, diſperſed here and there in the depths of the ſea. The ſalt being continually diluted and diſſolved by the water, the ſea becomes impregnated with its particles throughout; and for this reaſon the ſaltneſs of the ſea can never be diminiſhed. Dr. Halley ſuppoſes that it is probable the greateſt part of the ſea-ſalt, and of all ſalt lakes, as the Caſpian ſea, the Dead ſea, the Lake of Mexico, and the Titicaca in Peru, is derived from the water of the rivers which they receive; and ſince this ſort of lakes has no exit or diſcharge, but by the exhalation of vapours; and alſo ſince theſe vapours are entirely freſh, or devoid of ſuch particles, it is certain the ſaltneſs of the ſea and ſuch lakes muſt, from time

to

to time increaſe, and therefore the ſaltneſs at this time is greater than at any time heretofore. He further adds, that if, by experiments made in different ages, we could find the different quality of ſalt, which the ſame quantity of water (taken up in the ſame place, and in all other the ſame circumſtances) would afford, it would be eaſy from thence, by rules of proportion, to find the age of the world very nearly, or the time wherein it has been acquiring its preſent ſaltneſs.

With regard to the uſe of this ſalt property of ſea-water, it is obſerved that the ſaltneſs of the ſea preſerves its waters pure and ſweet, which otherwiſe would corrupt and ſtink like a filthy lake, and conſequently that none of myriads of creatures that now live therein, could then have a being. From thence alſo the ſea-water becomes much heavier, and therefore ſhips of greater ſize and quantity may be uſed thereon. Salt water alſo doth not freeze ſo ſoon as freſh water, whence the ſeas are more free for navigation. We have lately had publiſhed a diſſertation, by Dr. Ruſſel, concerning the medical uſes of ſea-water, in diſeaſes of the glands, *&c.* wherein the author premiſes ſome obſervations upon the nature of ſea-water, conſidered as impregnated with particles of all the bodies it paſſes over, ſuch as ſubmarine plants, fiſh, ſalts, minerals, *&c.* and ſaturated with their ſeveral effluvia, to enrich it, and keep it from putrefaction; hence this fluid is ſuppoſed to contract a ſoapineſs, and the whole collection being pervaded by the ſulphureous ſteams paſſing through it, to conſtitute what we call ſea-water, the confeſſed diſtinguiſhing characteriſtics of which are ſaltneſs, bitterneſs, nitroſity, and unctuoſity: whence the author concludes, that it may be juſtly expected to contribute ſignally to the improvement of phyſic. The caſes in which our author informs us we are to expect advantage from ſea-water, are, 1. In all recent obſtructions of the glands of the inteſtines and meſentery. 2. All recent obſtructions of the pulmonary glands, and thoſe of the viſcera, which frequently produce conſumptions. 3. All recent glandular ſwellings of the neck, or other parts. 4. Recent tumours of the joints, if they are not ſuppurated, or become ſcirrhous, or cancerous, and have not carious bones for their cauſe. 5. Recent defluxions upon the glands of the eye-lids. 6. All deſœdations of the ſkin, from an eryſipelas, to a lepra. 7. Diſeaſes of the glands of the noſe, with their uſual companion a thickneſs of the lip. 8. Obſtructions of the kidneys, when there is no inflammation, and the ſtone not large. 9. In recent obſtructions of the liver this method will be proper, where it prevents conſtipations of the belly, and aſſiſts other medicines directed in icteric caſes. The ſame remedy is ſaid to be of ſignal ſervice in the bronchocele; and is likewiſe recommended for the prevention of thoſe bilious colics that ſo frequently affect our mariners.

To make ſea-water freſh is a thing long and much wanted, for the advantage of navigation and commerce; a method for doing which has been long ago invented by Mr. Hauton, and the ſecret publiſhed in the Philoſ. Tranſact. It is performed by precipitating the water with oil of tartar, and then diſtilling it. But Mr. Appleby's proceſs, which was referred by the lords of the admiralty to the college of phyſicians, and communicated to the royal ſociety, with ſome experiments therewith, on Feb. 8, 1753, appears to be more ſucceſsful, and is performed thus: into twenty gallons of ſea-water put ſix ounces of a fixed alkali, prepared with quick-lime as ſtrong as lapis infernalis, and ſix ounces of bones, calcined to a whiteneſs, and finely powdered; with a ſlow fire, draw off, in a common ſtill, fifteen gallons. Mr. Appleby conceives that the alkali here employed is the beſt adapted to prevent the bituminous matter in ſea-water from riſing by heat in diſtillation.

For the ebbing and flowing of the ſea, ſee the article TIDES.

For the ſea-army, ſea-aſtrolabe, ſea-biſket, ſea-chart, ſea-compaſs, *&c.* ſee the articles ARMY, ASTROLABE, BISKET, CHART, *&c.*

SEA-MEN, ſuch as are reſerved to ſerve the king, or other perſons, at ſea, who may not depart without licenſe, *&c.* Seamen fighting, quarreling, or making any diſturbance, may be puniſhed by the commiſſioners of the navy, with fine and impriſonment. Regiſtered ſea-men are exempted from ſerving in any pariſh-office, *&c.* and are allowed bounty-money beſides their pay. By the law of merchants, the ſea-men of a veſſel are accountable to the maſter or commander, and the maſter to the owners, and the owners to the merchants, for damage ſuſtained either by negligence or otherwiſe. Where a ſea-

man is hired for a voyage, and he deſerts it before it is ended, he ſhall loſe his wages; and in caſe a ſhip be loſt by a tempeſt, or in a ſtorm, the ſea-men loſe their wages, as well as the owners their freight. See NAVAL AFFAIRS.

SEAFORD, a port-town of Suſſex, ſituated on the engliſh channel, ſeven miles ſouth of Lewes.

It ſends two members to parliament.

SEAL, *ſigillum*, a puncheon, or piece of metal, or other matter, uſually either round or oval, whereon are engraven the arms, device, &c. of ſome prince, ſtate, community, magiſtrate or private perſon, often with a legend or ſubſcription, the impreſſion whereof in wax, ſerves to make acts, inſtruments, &c. authentic.

Before the time of William the conqueror, the makers of all deeds only ſubſcribed their names, adding the ſign of the croſs, and a great number of witneſſes; but that monarch and the nobility uſed ſeals with their arms on them, which example was afterwards followed by others. The colour of the wax wherewith this king's grants were ſealed was uſually green, to ſignify that the act continued freſh for ever, and of force.

A ſeal is abſolutely neceſſary in reſpect of deeds, becauſe the ſealing of them makes perſons parties thereto, and without being ſealed, they are void in law. It is held, that if a ſeal be broken off, it will render the deed void, and that where ſeveral are bound in a bond, the pulling off the ſeal of one vacates it as to all the reſt.

The king's great ſeal is that whereby all patents, commiſſions, warrants, &c. coming from the king are ſealed. The keeping hereof is in the hands of the lord high chancellor, who is hence denominated lord keeper. Indeed there is ſome difference between the lord chancellor and lord keeper, not in office, but in the manner of creation, the latter being made by the delivery of the great ſeal to him by the king, but the former having a patent. The king's privy ſeal is a ſeal that is uſually firſt ſet to grants that are to paſs the great ſeal. See KEEPER.

SEAL is alſo uſed for the wax or lead, and the impreſſion thereon, affixed to the thing ſealed.

SEALER, an officer in chancery appointed by the lord chancellor or keeper of the great ſeal, to ſeal the writs and inſtruments there made in his preſence.

SEALING, in architecture, the fixing a piece of wood or iron in a wall with plaſter, mortar, cement, lead, and other ſolid binding. For ſtaples, hinges and joints, plaſter is very proper.

SEALING-WAX. See the article WAX.

SEAM or SEME *of corn*, is a meaſure of eight buſhels.

SEAM *of glaſs*, the quantity of 120 pound, or 24 ſtones, each five pounds weight. The ſeam of wood is an horſe load.

SEAMS *of a ſhip*, are places where her planks meet and join together. There is alſo a kind of peculiar ſeam in the ſowing of ſails, which they call monk-ſeam; the other ſeam of a ſail is the round ſeam, ſo called from its being round like the common ſeams.

SEARCE. See the article SIEVE.

SEARCHER. See the article ALNAGER.

Searcher is alſo an officer of the cuſtoms, whoſe buſineſs is to ſearch and examine all ſhips outward bound, to ſee whether they have any prohibited or unaccuſtomed goods on board.

SEAR-CLOTH, or CERE-CLOTH, in ſurgery, a form of external remedy ſomewhat harder than an unguent, yet ſofter than an emplaſter, though it is frequently uſed both for the one and the other. The ſear-cloth is always ſuppoſed to have wax in its compoſition, which diſtinguiſhes and even denominates it. In effect, when a liniment or unguent has wax enough in it, it does not differ from a ſear-cloth. Sear-cloths are a kind of ſubſtitutes to friction, and are ſometimes uſed for other purpoſes; the beſt are compounded of reſolvent drugs, as ſaffron, myrrh, and aloes, incorporated with wax and gums, as galbanum, gum ammoniac, and ſagapenum, the whole tempered with wine.

SEASE. See the article SEIZE.

SEASIN, or SEASING, in a ſhip, the name of a rope by which the boat rides by the ſhip's ſide when in harbour, &c.

SEASONS, in coſmography, certain portions or quarters of the year, diſtinguiſhed by the ſigns which the earth then enters, or by the meridian altitudes of the ſun, conſequent on which are different temperatures of the air, different works in tillage, &c. The year is divided into four ſeaſons, ſpring, ſummer, autumn, and winter. The beginnings and endings of each whereof, ſee under its proper article, SPRING, &c.

How the courſe of the earth's revolution about the ſun conſtitutes all the variety

of

of the ſeaſons, may be ſeen under the article EARTH.

SEASONING *of timber*. See TIMBER.

SEAT, in aſtronomy. See SHEAT.

SEAT, in the manege, the poſture or ſituation of a horſeman upon the ſaddle.

SEBASTIAN ST. a port-town of Spain, in the province of Biſcay, and territory of Guipuſcoa, ſituated in weſt long. 1° 50′, north lat. 43° 35′.

SEBESTENA, or CORDIA, SEBESTEN, in botany. See the article CORDIA.

The fruit of the ſebeſten is an attenuant and reſolvent, and has been frequently given in peripneumonies, in diſeaſes of the breaſt and lungs in general, and in ſtranguries and hoarſeneſſes, but now it is much grown out of uſe.

SEBUM, SUET, in anatomy. See the article SUET.

SECALE, or SECALINA, RYE, in botany, a genus of the *triandria-digynia* claſs of plants, the corolla whereof conſiſts of two valves; the exterior valve is rigid, ventricoſe, acuminated and compreſſed, its lower edge is ciliated, and it terminates in a long ariſta: the interior valve is lanceolated and plane; the nectaria are two, ovated and erect; the corolla ſerves the office of a pericarpium, incloſing the ſeed, and, at a proper time, opening and dropping it out; the ſeed is ſingle, oblong, and almoſt cylindric. See RYE.

SECANT, in geometry, is a line that cuts another, or divides it into two parts. See the article LINE.

Thus the line AM (plate CCXLIII. fig. 7. n° 1.) is a ſecant of the circle AED, *&c.* as it cuts it in B.

It is demonſtrated by geometers, 1. That if ſeveral ſecants MA, MN, ME, *&c.* be drawn from the ſame point M, that paſſing through the center MA is the greateſt, and the reſt are all ſo much the leſs as they are more remote from the center. On the contrary, the portions thereof without the circle MD, MO, MB, are ſo much the greater as they are farther from the center. 2. That if two ſecants, MA and ME be drawn from the ſame point M, the ſecant MA will be to ME, as MD to MB. See the article TANGENT.

In trigonometry, the ſecant denotes a right line drawn from the center of a circle, which cutting the circumference, proceeds till it meets with a tangent to the ſame circle: thus the line FC (*ibid.* n° 2.) drawn from the center C till it meet the tangent EF, is called a ſecant; and particularly the ſecant of the arch AE to which EF is a tangent. The ſecant of the arch AH, which is the complement of the former arch to a quadrant, is called the co-ſecant, or ſecant of the complement. See the articles CIRCLE, COMPLEMENT, *&c.*

For the properties and uſe of the ſecant, ſee the articles TRIGONOMETRY, NAVIGATION, SURVEYING, *&c.*

For the line of ſecants on the ſector, ſee the article SECTOR.

SECOND, in geometry, chronology, *&c.* the ſixtieth part of a prime or minute, whether of a degree, or of an hour: it is denoted by two ſmall accents, thus (″). See DEGREE, HOUR, MINUTE, *&c.*

SECOND, in muſic, one of the muſical intervals; being only the difference between any ſound, and the next neareſt ſound, whether above or below it. See the article INTERVAL.

As in the compaſs of a tone ſome reckon nine ſenſible ſounds, and others ten, which form the intervals called commas; ſo there are eight kinds of ſeconds according to the former opinion, and nine according to the latter. However, in practice, they uſually diſtinguiſh only four ſorts. 1. That called a diminiſhed ſecond, containing four commas; being the difference, for inſtance, of a natural *ut*, and an *ut* ſharp. 2. That called a ſecond minor, or imperfect ſecond, containing five commas, *viz.* from *mi* to *fa*; or from *la* to B *mol*; or from *fa* ſharp to *ſol*. 3. A major ſecond, called by the Italians a perfect ſecond, containing nine commas. 4. A redundant ſecond, compoſed of a whole tone, and a minor ſemitone.

SECONDARY, in general, ſomething that acts as ſecond, or in ſubordination to another.

Secondary circles of the ſphere, are circles paſſing through the poles of ſome great circle: thus the meridians and hour-circles are ſecondaries to the equinoctial. There are alſo ſecondaries paſſing through the poles of the ecliptic, by means of which all ſtars are referred to the ecliptic. See the articles ECLIPTIC, LONGITUDE, SPHERE, *&c.*

SECRETARY, an officer who by his maſter's orders writes letters, diſpatches, and other inſtruments, which he renders authentic by his ſignet. Of theſe there are ſeveral kinds; as, 1. Secretaries of ſtate, who are officers that have under their management and direction the moſt

important

important affairs of the kingdom, and are obliged conſtantly to attend on the king: they receive and diſpatch whatever comes to their hands, either from the crown, the church, the army, private grants, pardons, diſpenſations, *&c.* as likewiſe petitions to the ſovereign; which when read, are returned to them; all which they diſpatch according to the king's direction. They have authority to commit perſons for treaſon, and other offences againſt the ſtate, as conſervators of the peace at common law, or as juſtices of the peace throughout the kingdom. They are members of the privy-council, which is ſeldom or never held without one of them being preſent; and as to the buſineſs and correſpondence in all parts of this kingdom, it is managed by either of the ſecretaries without any diſtinction; but with reſpect to foreign affairs, the buſineſs is divided into two provinces, or departments, the ſouthern and the northern, comprehending all the kingdoms and ſtates that have any intercourſe with Great Britain; each ſecretary receiving all letters and addreſſes from, and making all diſpatches to, the ſeveral princes and ſtates comprehended in his province: which diviſion ſtill ſubſiſts, notwithſtanding the addition of a third ſecretary for Scotland. Ireland and the Plantations are under the direction of the elder ſecretary, who has the ſouthern province, which alſo comprehends France, Italy, Switzerland, Spain, Portugal, and Turky: the northern province includes the Low Countries, Germany, Denmark, Sweden, Poland, and Muſcovy. Each of the ſecretaries have an apartment in all the royal houſes, both for their own accommodation and their officers; they have alſo a table at the king's charge, or elſe board-wages. The two ſecretaries for South Britain, have each two under ſecretaries, and one chief clerk; and the ſecretary for North Britain has an under ſecretary, and one chief clerk, with an uncertain number of other clerks and tranſlators, all wholly depending on them. To the ſecretaries of ſtate belong the cuſtody of that ſeal properly called the ſignet, and the direction of two other offices, one called the paper-office, and the other the ſignet-office. See the articles PAPER-OFFICE and SIGNET-OFFICE.

2. Secretary of an embaſſy, a perſon attending an embaſſador for writing diſpatches relating to the negotiation. There is a great difference between the ſecretary of an embaſſy, and the embaſſador's ſecretary; the laſt being a domeſtic or menial of the embaſſador, and the firſt, a ſervant or miniſter of the prince.

3. The ſecretary of war, an officer of the war-office, who has two chief clerks under him, the laſt of which is the ſecretary's meſſenger. There are alſo ſecretaries in moſt of the other offices.

SECRETION, *ſecretio*, in the animal oeconomy, the ſeparation of ſome fluid mixed with the blood by means of the glands. See the article GLAND.

In the bodies of animals we obſerve a great number of juices of different natures, *viz.* the blood, lympha, ſaliva, ſtomach-liquor, inteſtinal juices, pancreatic juice, bile, urine, *&c.* and the blood is the general ſource of all. See the article BLOOD, LYMPH, SALIVA, *&c.*

The manner wherein this ſecretion is performed, has been greatly enquired into for a century paſt; but as the exceeding minuteneſs of the organs whereby ſecretion is effected prevents any regular ſearch, various authors have imagined various methods for explaining it. The antient phyſicians contented themſelves only with aſſerting certain particular virtues or faculties inherent in the viſcera, whereby they were determined to ſeparate one liquor rather than another. Some of the moderns, full of the effects they have obſerved from fermentations, maintain, that there are ferments in the ſeveral parts, by the aid whereof certain kinds of particles mixed in the blood are ſeparated therefrom, after the ſame manner as we ſee in muſt or new wine, from which, while fermenting, certain parts are detached in form of froth. Others conſider the glands as kinds of ſieves, whoſe holes having different figures, will only let paſs certain particles or molecules, whoſe figures reſemble thoſe of the holes; but the many inconveniencies which both theſe ſuppoſitions have to grapple with al, made ſome naturaliſts have recourſe to what is called imbibition: theſe maintain, that beſides the different diameters of the pores, it is required that the ſeveral parts be already imbued or moiſtened with a liquor like to that they are to filtre.

This opinion Winſlow adapted; and not ſatisfied with conjectural principles, applied himſelf to experiments, in order to inveſtigate the manner wherein ſecretion

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is performed, and lays it down thus. It is well known that a piece of brown paper, which is only an aſſemblage of ſmall fibres compacted cloſe to each other, having once imbibed oil or water, will never let any other liquor paſs through it but of the ſame kind with what it is impregnated with; all others it ſtops. Now in the ſecretory ducts of the glands we find a parallel ſtructure, an aſſemblage of fine threads or filaments bound cloſe together, much as in brown paper, *&c.* only differently diſpoſed; this plexus then having once imbibed a certain juice, will not let paſs any of the liquors which arrive at the orifices of theſe ducts, but that which it had firſt imbibed: the cauſe of this phænomenon is referred to the attraction of coheſion, which is found ſtronger between the homogeneous than the heterogeneous parts of the ſame fluid. As the blood then is not a homogeneous liquor, but a compound of an infinity of different parts or molecules, ſome oily, others mucilaginous, aqueous, ſaline, ſubtile, groſs, *&c.* in its motion along the arteries of the gland, it becomes divided into all the little ramifications thereof, by which means its velocity is exceedingly abated, and the molecules are obliged to go off, one by one, through the narrow paſſage of the artery into the vein, and of conſequence to paſs over the orifice of the ſecretory ducts of the glands, whoſe down is already tinged with a juice of a certain nature: ſuch of the molecules, therefore, as are found of the ſame nature with the juice they met withal at the entrance of the ſecretory duct, join themſelves to them, and entering the ducts, are driven on by others that follow them, and are at length driven into the excretory duct. But how theſe parts ſhould have firſt imbibed the particular juices neceſſary for their reſpective ſecretions, is the queſtion. Mr. Winſlow thinks it probable that they had been imbued with the juices they were to filtrate at the firſt formation of the animal, or at the time when the ſolid parts were framed.

Kiel accounts for ſecretion from the joint conſideration of the different diameters of the veſſels, the different velocity of the blood, the different angles the ducts make with the arteries, and the different attraction of the various parts under all theſe different circumſtances. It is obſerved, that in this theory there is ſomething arbitrary and conjectural; beſides, that the reaſoning is carried on to ſuch a length, that in a thing, the principles whereof are ſo obſcure, the parts or organs ſo imperfectly known, and the whole proceſs carried on out of ſight, the mind cannot ſafely acquieſce in it.

Hales makes it evident from experiments, that the animal ſecretions are not made with the full force of the arterial blood, but more gradually and ſparingly, ſo as to be carried forward in thoſe very fine veſſels by an alternate pulſive force of the arterial fluid, and attractive power of the fine ſecerning veſſels, aſſiſted alſo by conſtant vibrations; for the animal fluids and ſolids are in an inceſſant, mutually, vibrating ſtate. In this manner, doubtleſs, the plentiful ſecretions are made into the ſtomach and guts, as alſo in the pancreas, meſenteric, ſalival, and other glands of the body; and thus alſo the perſpiring matter is carried off, not by the more protruſive force of the arterial blood alone, but alſo by the warmth and mutual action of the fluids and ſolids. See PERSPIRATION, *&c.*

For the uſe, *&c.* of the animal ſecretions, ſee EXCRETION and EXCREMENT.

SECT, *ſecta*, a collective term, comprehending all ſuch as follow the doctrines and opinions of ſome famous divine, philoſopher, *&c.* See the articles HERESY and SCHISM.

The principal ſects among the antient philoſophers were the epicureans, peripatetics, academics, ſtoics, pyrrhoniſts, *&c.* See the article EPICUREANS, *&c.*

Among the moderns, the newtonians, carteſians, *&c.* are the principal ones in Europe. See NEWTONIAN, *&c.*

And the calviniſts, lutherans, papiſts, anabaptiſts, arians, ſocinians, arminians, *&c.* are the principal ſects to be found among modern divines. See the article CALVINISTS, *&c.*

SECTION, in general, denotes a part of a divided thing, or the diviſion itſelf. Such, particularly, are the ſubdiviſions of a chapter; called alſo paragraphs and articles: the mark of a ſection is §.

SECTION, in geometry, denotes a ſide or ſurface appearing of a body or figure cut by another; or the place where lines, planes, *&c.* cut each other.

The common ſection of two planes is always a right line; being the line ſuppoſed to be drawn on one plane by the ſection of the other, or by its entrance into it.

SECTION *of a building*, in architecture, is the ſame with its profile; or a delineation of its heights and depths raiſed on a plane, as if the fabric was cut aſunder to diſcover its inſide.

Conic SECTIONS, in geometry. See the articles CONE and CONIC.

SECTOR, in geometry, is a part of a circle, comprehended between two radii and the arch; or it is a mixed triangle, formed by two radii and the arch of a circle. See the articles CIRCLE, ARCH, RADIUS, TRIANGLE, *&c.*

For the method of finding the area of a ſector, as well as of a ſegment of a circle, ſee the article SEGMENT.

SECTOR is alſo a mathematical inſtrument, of great uſe in finding the proportion between quantities of the ſame kind, as between lines and lines, ſurfaces and ſurfaces, *&c.* for which reaſon the French call it the compaſs of proportion.

The great advantage of the ſector above common ſcales, *&c.* is, that it is adapted to all radii, and all ſcales. For, by the line of chords, ſines, tangents, *&c.* on the ſector, we have lines of chords, ſines, tangents, *&c.* adapted to any radius betwixt the length and breadth of the ſector, when opened.

The ſector is founded on the fourth propoſition of the ſixth book of Euclid, where it is demonſtrated, that ſimilar triangles have their homologous ſides proportional; an idea of its foundation or theory may be conceived from what follows: let the lines AB, AC (plate CCXLIII. fig. 4.) repreſent the two legs of the ſector, and AD, AE, two equal ſections from the center. If now the points BC and DE be connected, the lines BC and DE will be parallel; therefore the triangles ADE, and ABC, will be ſimilar, and conſequently the ſides AD, DE, AB, BC, proportional; that is, as AD : DE :: AB : BC; whence, if AD be the half, third, or fourth part of AB, DE will be a half, third, or fourth part of BC. Whence it follows, that if AD be the chord, ſine, tangent, *&c.* of any number of degrees to the radius AB, DE will be the ſame to the radius BC.

Deſcription of the SECTOR. This inſtrument conſiſts of two equal legs, or rules of braſs, *&c.* riveted together, but ſo as to move eaſily on the rivet; (*ibid.* fig. 1, 2.) on the faces of the inſtrument are placed ſeveral lines; the principal of which are the line of equal parts, line of chords, line of ſines, line of tangents, line of ſecants, and line of polygons.

The line of equal parts, called alſo the line of lines, marked L, is a line divided into 100 equal parts, and, where the length of the leg will allow it, each of theſe is ſubdivided into halves and quarters. It is found on each leg, on the ſame ſide, and the diviſions numbered 1, 2, 3, 4, 5, *&c.* to 10, which is near the extremity of each leg. Note, in practice, 1 repreſents either 1, 10, 100, 1000, 10000, *&c.* as occaſion requires, in which caſe, 2, repreſents 2, 20, 200, 2000, 20000, *&c.* and ſo of the reſt. The line of chords, marked C on each leg, is divided after the uſual manner, and numbered 10, 20, 30, *&c.* to 60. The line of ſines, denoted on each leg by the letter S, is a line of natural ſines, numbered 10, 20, 30, *&c.* to 90. The line of tangents, denoted on each leg by the letter T, is a line of natural tangents, numbered 10, 20, 30, *&c.* to 45. Beſides which there is another little line of tangents on each leg, commencing at 45°, and extending to 75°, denoted by the letter *t*. Line of ſecants, denoted on each leg by the letter *ſ*, is a line of natural ſecants, numbered 10, 20, 30, *&c.* to 75, not commencing at the center of the inſtrument, but at ſome diſtance therefrom. The line of polygons, denoted by the letter P on each leg, is numbered 4, 5, 6, *&c.* to 12, which falls conſiderably ſhort of the center of the inſtrument. See CHORD, SINE, *&c.*

Beſides theſe lines, which are eſſential to the ſector, there are others placed near the outward edges on both ſides, and parallel thereto, which are in all reſpects the ſame as thoſe on Gunter's ſcale, and uſed after the ſame manner. Such are the lines of artificial ſines marked S, of artificial tangents marked T, and Gunter's line of numbers marked N; theſe lines do not extend to the end of the inſtrument. There are ſometimes other lines placed, to fill the vacant ſpaces, as the lines of hours, latitudes, and inclination of meridians, which are uſed the ſame as on the common ſcales. See the articles GUNTER, SCALE, *&c.*

The lines found by the ſector are of two kinds, lateral and parallel; the firſt are ſuch as are found by the ſides of the ſector, as AB, AC (*ibid.* fig. 4.) the latter ſuch as go acroſs from one leg to the other, as DE, BC. Note, the lines are not placed in the ſame order on

The SECTOR

Fig. 1.

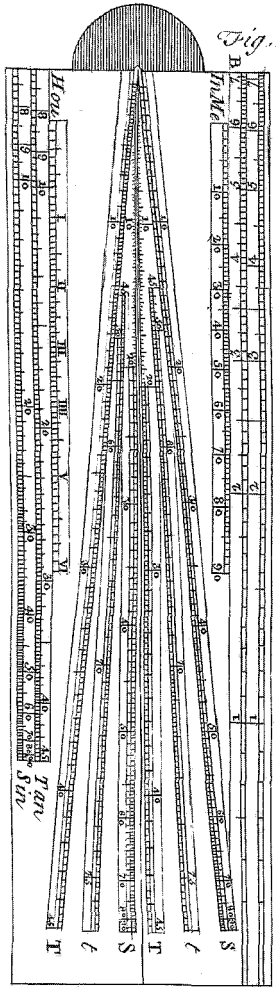


Fig. 2.

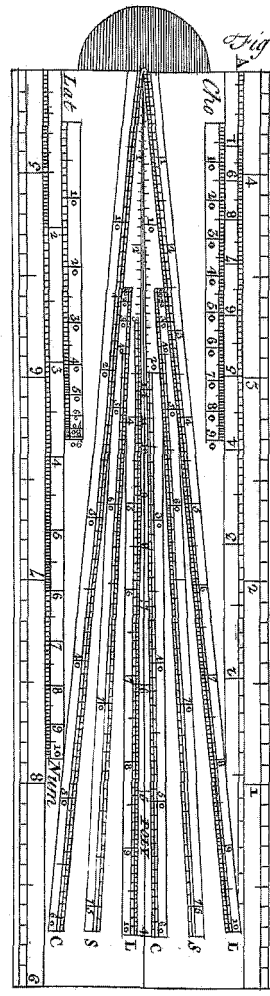


Fig. 7. SECANT

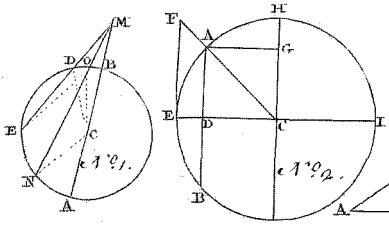


Fig. 5.

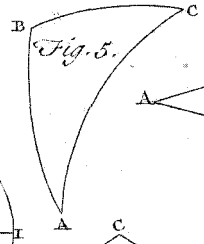


Fig. 4.

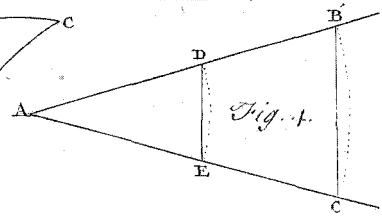


Fig. 3.

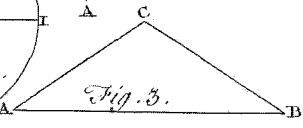
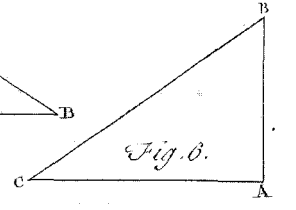


Fig. 6.



T. Jefferys sculp.

all ſectors, but they may be eaſily found by the above directions.

Uſe of the line of equal parts on the SECTOR.

1. To divide a given line into any number of equal parts, ſuppoſe ſeven. Take the given line in your compaſſes, and ſetting one foot in a diviſion of equal parts, that may be divided by ſeven, for example, 70, whoſe ſeventh part is 10, open the ſector till the other point fall exactly on 70, in the ſame line on the other leg. In this diſpoſition, applying one point of the compaſſes to 10, in the ſame line, ſhut them till the other fall in 10, in the ſame line, on the other leg, and this opening will be the ſeventh part of the given line. Note, if the line to be divided be too long to be applied to the legs of the ſector, divide only one half, or one fourth by 7, and the double or quadruple thereof will be the ſeventh part of the whole.

2. To meaſure the lines of the perimeter of a polygon, one of which contains a given number of equal parts. Take the given line in your compaſſes, and ſet it parallel, upon the line of equal parts, to the number on each leg expreſſing its length. The ſector remaining thus, ſet off the length of each of the other lines parallel to the former, and the numbers each of them falls on, will expreſs their lengths.

3. A right-line being given, and the number of parts it contains, ſuppoſe 120, to take from it a ſhorter line, containing any number of the ſame parts, ſuppoſe 25. Take the given line in your compaſſes, open the ſector till the two feet fall on 120 on each leg; then will the diſtance between 25 on one leg, and the ſame number on the other, give the line required.

4. To multiply by the line of equal parts on the ſector. Take the lateral diſtance from the center of the line to the given multiplicator; open the ſector till you fit that lateral diſtance to the parallel of 1 and 1, or 10 and 10, and keep the ſector in that diſpoſition; then take in the compaſſes the parallel diſtance of the multiplicand, which diſtance, meaſured laterally on the ſame line, will give the product required. Thus, ſuppoſe it were required to find the product of 8, multiplied by 4: take the lateral diſtance from the center of the line to 4 in your compaſſes, *i. e.* place one foot of the compaſſes in the beginning of the diviſions, and extend the other along the line to 4. Open the ſector till you fit this lateral diſtance to the parallel of 1 and 1, or 10 and 10. Then take the parallel diſtance of 8, the multiplicand; *i. e.* extend the compaſſes from 8, in this line, on one leg, to 8 in the ſame line on the other, and that extent, meaſured laterally, will give the product required.

5. To divide by the line of equal parts on the ſector. Extend the compaſſes laterally from the beginning of the line to 1, and open the ſector till you fit that extent to the parallel of the diviſor; then take the parallel diſtance of the dividend, which extent, meaſured in a lateral direction, will give the quotient required. Thus ſuppoſe it was required to divide 36 by 4; extend the compaſſes, laterally, the beginning of the line to 1, and fit to that extent the parallel of 4, the diviſor; then extend the compaſſes parallel, from 36 on one leg, to 36 on the other, and that extent, meaſured laterally, will give 9, the quotient required.

6. To work any proportion by the ſector. Take the ſecond term lateral, and, opening the ſector, apply that extent parallel in the firſt term, and ſtay the ſector in that poſition; then take the parallel diſtance of the third term, which extent, meaſured laterally, gives the fourth term required. This is ſo eaſy, from what has already been ſaid, that it needs no example.

The uſe of the line of chords on the SECTOR.

1. To open the ſector ſo as the two lines of chords may make an angle or number of degrees, ſuppoſe 40. Take the diſtance from the joint to 40, the number of the degrees propoſed, on the line of chords; open the ſector till the diſtance from 60 to 60, on each leg, be equal to the given diſtance of 40; then will the two lines on the ſector form an angle of 40 degrees, as was required.

2. The ſector being opened, to find the degrees of its aperture. Take the extent from 60 to 60, and lay it off on the line of chords from the center; the number whereon it terminates will ſhew the degrees, *&c.* required.

3. To lay off any number of degrees upon the circumference of a circle. Open the ſector till the diſtance between 60 and 60 be equal to the radius of the given circle; then take the parallel extent of the chord of the number of degrees on each leg of the ſector, and lay

it off on the circumference of the given circle. Hence any regular polygon may be eaſily inſcribed in a given circle.

Uſe of the line of polygons on the SECTOR.

1. To inſcribe a regular polygon in a given circle. Take the ſemi-diameter of the given circle in the compaſſes, and adjuſt it to the number 6, on the line of polygons, on each leg of the ſector: then, the ſector remaining thus opened, take the diſtance of the two equal numbers, expreſſing the number of ſides the polygon is to have; *e. gr.* the diſtance from 5 to 5 for a pentagon, from 7 to 7 for a heptagon, *&c.* Theſe diſtances carried about the circumference of the circle, will divide it into ſo many equal parts.

2. To deſcribe a regular polygon, *e. gr.* a pentagon, on a given right line. Take the length of the line in the compaſſes, and apply it to the extent of the number 5, 5, on the lines of polygons. The ſector thus opened, upon the ſame lines, take the extent, from 6 to 6; this will be the ſemi-diameter of the circle the polygon is to be inſcribed in. If, then, with this diſtance, from the ends of the given line, you deſcribe two arches of a circle, their interſection will be the center of the circle.

3. On a right line, to deſcribe an iſoſceles triangle, having the angles at the baſe double that at the vertex. Open the ſector, till the ends of the given line fall on 10 and 10 on each leg; then take the diſtance from 6 to 6. This will be the length of the two equal ſides of the triangle.

Uſe of the lines of ſines, tangents, and ſecants, on the SECTOR. By the ſeveral lines diſpoſed on the ſector, we have ſcales to ſeveral radiuſes; ſo that having a length or radius given, not exceeding the length of the ſector when opened, we find the chord, ſine, *&c.* thereto, *e. gr.* Suppoſe the chord, ſine, or tangent, of 10 degrees, to a radius of 3 inches, required; make 3 inches the aperture, between 60 and 60, on the lines of chords of the two legs; then will the ſame extent reach from 45 to 45 on the line of tangents, and from 90 to 90 on the line of the ſines on the other ſide; ſo that to whatever radius the line of chords is ſet, to the ſame are all the others ſet. In this diſpoſition, therefore, if the aperture between 10 and 10, on the lines of chords, be taken with the compaſſes, it will give the chord of 10 degrees. If the aperture of 10 and 10 be in like manner taken on the lines of ſines, it will be the ſine of 10 degrees. Laſtly, if the aperture of 10 and 10 be in like manner taken on the lines of tangents, it gives the tangent of 10 degrees.

If the chord, or tangent, of 70 degrees were required; for the chord, the aperture of half the arch, *viz.* 35, muſt be taken, as before; which diſtance, repeated twice, gives the chord of 70 degrees. To find the tangent of 70 degrees to the ſame radius, the ſmall line of tangents muſt be uſed, the other only reaching to 45: making, therefore, 3 inches the aperture between 45 and 45 on the ſmall line; the extent between 70 and 70 degrees on the ſame, will be the tangent of 70 degrees to 3 inches radius.

To find the ſecant of an arch, make the given radius the aperture between 0 and 0 on the line of ſecants: then will the aperture of 10 and 10, or 70 and 70, on the ſaid lines, give the tangent of 10°, or 70°.

If the converſe of any of theſe things were required; that is, if the radius be required, to which a given line is the ſine, tangent, or ſecant, it is but making the given line, if a chord, the aperture on the line of chords, between 10 and 10, and then the ſector will ſtand at the radius required; that is, the aperture between 60 and 60, on the ſaid line, is the radius. If the given line were a ſine, tangent, or ſecant, it is but making it the aperture of the given number of degrees; then will the diſtance of 90 and 90 on the ſines, of 45 and 45 on the tangents, of 0 and 0 on the ſecants, be the radius.

Uſe of the SECTOR *in trigonometry.* 1. The baſe and perpendicular of a rectangled triangle being given, to find the hypotenuſe. Suppoſe the baſe AC (*ibid.* fig. 6.) 40 miles, and the perpendicular AB 30; open the ſector till the two lines of lines make a right angle: then for the baſe take 40 parts on the line of lines, on one leg; and for the perpendicular 30 on the ſame line, on the other leg: then the extent from 40 on the one, to 30 on the other, taken in the compaſſes, will be the length of the hypotenuſe, which line will be found 50 miles.

2. The perpendicular AB of a right-angled triangle ABC being given, 30, and the angle BCA, 37°, to find the hypo-

hypotenuſe BC. Take the given ſide AB, and ſet it over, on each ſide, upon the ſine of the given angle ACB; then the parallel diſtance of radius, or of 90 and 90, will be the hypotenuſe BC; which will meaſure 50 on the line of ſines.

3. The hypotenuſe and baſe being given, to find the perpendicular. Open the ſector, till the two lines of lines be at right angles; then lay off the given baſe on one of thoſe lines from the center. Take the hypotenuſe in your compaſſes, and, ſetting one foot in the point of the given baſe, let the other fall on the line of lines, on the other leg: the diſtance from the center to the point where the compaſſes fall, will be the length of the perpendicular.

4. The hypotenuſe being given, and the angle ACB, to find the perpendicular. Make the given hypotenuſe a parallel radius, *i. e.* make it the extent from 90 to 90 on the lines of ſines; then will the parallel ſine of the angle ACB be the length of the ſide AB.

5. The baſe and perpendicular AB given, to find the angle BCA. Lay off the baſe AC on both ſides of the ſector, from the center, and note its extent: then take the given perpendicular, and to it open the ſector, in the terms of the baſe; the parallel radius will be the tangent of BCA.

6. In any right-lined triangle, two ſides being given, with the included angle, to find the third ſide. Suppoſe the ſide AC (*ibid.* fig. 3.) 20, the ſide BC 30, and the included angle ACB 110°; open the ſector, till the two lines of lines make an angle equal to the given angle, *viz.* 110. Lay off the given ſides of the triangle from the center of the ſector, on each of the lines of lines; the extent between their extremes is the length of the ſide AB ſought.

7. The angles CAB and ACB given, and the ſide CB, to find the baſe AB. Take the given ſide CB, and turn it into the parallel ſine of its oppoſite angle CAB; and the parallel ſine of the angle ACB will be the length of the baſe AB.

8. The three angles of a triangle being given, to find the proportion of the ſides. Take the lateral lines of the ſeveral angles, and meaſure them in the line of lines; the numbers anſwering thereto give the proportion of the ſides.

9. The three ſides being given, to find the angle ACB. Lay the ſides AC, BC, along the line of lines, from the center; and ſet over the ſide AB in their terms: ſo is the ſector opened, in theſe lines to the quantity of the angle ACB.

10. The hypotenuſe AC (*bid.* fig. 5.) of a right angled ſpherical triangle ABC given, *e. gr.* 43°, and the angle CAB 20°; to find the ſide CB. The rule is: as radius is to the ſine of the given hypotenuſe 43°, ſo is the ſine of the given angle 20° to the ſine of the perpendicular CB. Take therefore 20° from the center, along the line of ſines, in your compaſſes, and ſet the extent from 90 to 90, on the two legs; and the parallel line of 43°, the given hypotenuſe, will, when meaſured from the center of the line of ſines, give 13° 30′, the ſide required.

11. The perpendicular BC, and the hypotenuſe AC being given, to find the baſe AB. As the ſine complement of the perpendicular BC is to radius, ſo is the ſine complement of the hypotenuſe to the ſine complement of the baſe. Make, therefore, the radius a parallel ſine of the given perpendicular, then the parallel ſine of the hypotenuſe meaſured along the line of ſines, will give the complement of the baſe required.

SECULAR, ſomething that is temporal, in which ſenſe the word ſtands oppoſed to eccleſiaſtical: thus we ſay, ſecular power, ſecular juriſdiction, *&c.*

Secular is more peculiarly uſed for a perſon who lives at liberty in the world, not ſhut up in a monaſtery, nor bound by vows, or ſubjected to the particular rules of any religious community; in which ſenſe it ſtands oppoſed to regular. The romiſh clergy is divided into ſecular and regular.

SECULAR GAMES, *ludi ſeculares*, in antiquity, ſolemn games held among the Romans once in an age. Theſe games laſted three days and as many nights, during which time ſacrifices were performed, theatrical ſhews exhibited, with combats, ſports, *&c.* in the circus. The occaſion of theſe games, according to Valerius Maximus, was to ſtop the progreſs of a plague. The firſt who had them celebrated at Rome was Valerius Publicola, the firſt conſul created after the expulſion of the kings. The ceremonies to be obſerved therein were found

prescribed in one of the books of the Sibyls. At the time of the celebration of the secular games, heralds were sent throughout all the empire, to intimate that every one might come and see those solemnities which he never yet had seen, nor was ever to see again. Authors are not agreed as to the number of years wherein these games returned, partly because the quantity of an age or seculum, among the antients, is not known, and partly on other accounts; some will have it that they were held every hundred years, and that the seculum or age was our century.

SECULAR POEM, *carmen seculare*, a poem sung or rehearsed at the secular games, of which kind we have a very fine piece among the works of Horace, being a sapphic ode at the end of his epodes.

SECULARIZATION, the act of converting a regular person, place, or benefice into a secular one. Almost all the cathedral churches were antiently regular, that is, the canons were to be religious; but they have been since secularized. For the secularization of a regular church, there is required the authority of the pope, that of the prince, the bishop of the place, the patron, and even the consent of the people. Religious that want to be released from their vow, obtain briefs of secularization from the pope.

SECUNDA AQUA, among chemists, *&c.* aqua fortis that has been already used to dissolve some metal.

SECUNDA SUPER ONERATIONE PASTURÆ, in law, a writ that lies where admeasurement of pasture has been made, and he that first surcharged the common, does again surcharge it, notwithstanding the admeasurement.

SECUNDARY, or SECONDARY. See the article SECONDARY.

SECUNDINES, *secundinæ*, *after birth*, in anatomy, the several coats or membranes wherein the fœtus is wrapped up in the mother's womb, as the chorion and amnios, with the placenta, *&c.* See the articles CHORION, AMNIOS, PLACENTA, ALLANTOIS, *&c.*

Hippocrates observes, that twins have always the same secundines. The secundines must never be left in the matrix, it being a foreign body which would destroy the mother. It is dangerous even to have the least piece of it left behind. See the article DELIVERY.

The human secundines are said to be of some use in medicine. Thus they are by some ordered to be applied warm as they come from the uterus to the face, in order to remove freckles. A water is also distilled from them in balnæo mariæ for destroying spots or blemishes of the face: when dried and reduced to a powder, they are used internally against epilepsies, for accelerating the delivery of the fœtus, and allaying the pain of wounds. The dose of this powder is from half a scruple to two scruples.

Dr. Grew, in his anatomy of plants, applies the term secundine to the fourth and last coat or cover of seeds, by reason this performs nearly the same office in plants, that the membranes investing the fœtus do in animals.

SECURIDACA, in botany, a genus of the *diadelphia-decandria* class of plants, the corolla whereof is papilionaceous; the vexillum is roundish and very large; the alæ are obtuse, and the carina lunulated. The fruit is roundish, ending in a very large, oblong, obtuse, perpendicular membrane, broadest above; the seed is single, and is invested with the whole pericarpium.

This plant taken inwardly is good for the stomach, and is an ingredient in antidotes used in a pessary with honey before coition, supposed to prevent conception.

SECURIDACA is also the name whereby some authors call the coronilla. See the article CORONILLA.

SECURITATE PACIS, in law, a writ lying for a person who is threatened with danger from another against him that threatens it issues out of the court of chancery, and is directed to the sheriff, *&c.*

SECURITATEM INVENIENDI QUOD SE NON DIVERTAT AD PARTES EXTERAS SINE LICENTIA REGIS, is an antient writ which lay for the king against any of his subjects, to stay them from going out of the kingdom to foreign parts.

SECUTORES, in antiquity, a kind of gladiators among the Romans, who fought against the retiarii. The secutores were armed with a sword and a buckler, to keep off the net or noose of their antagonists, and they wore a cask on their head.

This was also a name given to such gladiators as took the place of those killed in the combat, or who fought the conqueror.

SEDAN, a town of Champain, in France, situ-

ſituated on the river Maes, in eaſt long. 4° 45′, north lat. 49° 46′.

SEDANTIA, SEDATIVE MEDICINES, in pharmacy, ſuch medicines as are poſſeſſed of a power not only of compoſing, checking, and allaying the exorbitant and irregular motions of the ſolids and fluids, but alſo of alleviating and reſolving the painful ſpaſmodic ſtructures of the parts. As the effect of theſe medicines are very extenſive, we may juſtly include in their number paregorics, which not only relax and gently ſooth the rigid fibres, but alſo obtund the acrimony of the juices; anodynes, which alleviate the violence of racking pains; antiſpaſmodics, which mitigate and remove the ſpaſmodic ſtructures of the parts; antiepileptics, which check convulſive motions; hypnotics, which procure ſleep; and narcotics, which induce a conſiderable ſtupor of the ſenſes and torpor of all the motions of the body. See PAREGORIC, ANODYNE, ANTISPASMODIC, &c.

SE DEFENDENDO, in law, a plea uſed for him that is charged with the death of another, by alledging that he was under a neceſſity of doing what he did in his own defence; as that the other aſſaulted him in ſuch a manner, that if he had not done what he did, he muſt have been in hazard of his own life. But here the danger muſt appear ſo great, as to be inevitable. Any perſon in his juſt defence may kill others for the ſafety of his life; though if malice be coloured under a pretence of neceſſity, or one kill another before he is under a neceſſity of ſo doing, the ſame may be either murder or manſlaughter by our law. See the articles MURDER and MANSLAUGHTER. Where two perſons ſuddenly fall out, and one of them, being attacked, flies to the wall, or any unpaſſable place, as far as he can, in order to ſave his life, but being ſtill purſued, kills the perſon that attacked him, this killing, as well as others in the like caſes, is ſe defendendo. In ſe defendendo, though the affair juſtifies the killing to have been in his own defence, he is nevertheleſs obliged to ſue out his pardon from the lord chancellor, which of courſe is granted him, but yet his goods and chattels become forfeited to the king. It is ſaid, however, that upon the ſpecial matter found, he may be diſmiſſed without any forfeiture, &c.

SEDIMENT, the ſettlement or dregs of any thing, or that groſs heavy part of a fluid body which, upon reſting, ſinks to the bottom of the veſſel.

SEDR, or SEDRE, the high prieſt of the ſect of Ali among the Perſians. The ſedr is appointed by the emperor of Perſia, who uſually confers the dignity on his neareſt relation. The juriſdiction of the ſedr extends over all effects deſtined for pious purpoſes, over all moſques, hoſpitals, colleges, ſepulchres, and monaſteries. He diſpoſes of all eccleſiaſtical employments, and nominates all the ſuperiors of religious houſes. His deciſions in matters of religion are received as ſo many infallible oracles; he judges of all criminal matters in his own houſe without appeal. His authority is ballanced by that of the mudſitehid, or firſt theologue of the empire.

SEDUM, in botany, a genus of the *decandria-pentagynia* claſs of plants, the corolla whereof conſiſts of five accuminated, lanceolated, plane, patent petals; the fruit conſiſts of five erecto-patent, accuminated compreſſed capſules, emarginated towards the baſe, and opening longitudinally upwards and downwards; the ſeeds are numerous and ſmall.

This genus comprehends the ſedum, or houſe-leek, orpine, wall-pepper, and other ſpecies; all which agree in virtues with orpine. See ORPINE.

SEED, *ſemen*, in phyſiology, a ſubſtance prepared by nature, for the reproduction and conſervation of the ſpecies, both in animals and plants. See GENERATION.

The ſeed of animals, and particularly of mankind, is a whitiſh fluid ſecreted from the blood in the teſtes. See TESTES.

It is the thickeſt and moſt elaborated of all the humours in the human body; and by a chemical analyſis, is found to conſiſt almoſt entirely of oil and volatile ſalts blended with a little phlegm. The ſeminal liquor, however, ſuch as emitted for uſe, is a mixture of the true ſemen with the liquors of the proſtatæ, and other glands of the penis: all which, in the act of coition, are poured at the ſame time into the common canal of the urethra, either from the glands where they are ſecreted, or the reſervoirs where they are kept; and being there blended together, are injected into the uterus. See the articles CONCEPTION, GENERATION, FOETUS, &c.

The ſeed of vegetables is their laſt product, whereby the ſpecies are propagated; being frequently the fruit of a plant, but ſome-

ſometimes only a part included in the fruit.

Every ſeed conſiſts of an embryo-plant, called plantula ſeminalis, with its covers. The embryo, which is the whole future plant in miniature, is called the germ or bud; and is rooted in the cotyledon or placenta, which makes its involucrum or cover. The cotyledon is always double; and in the middle, and common center of the two, is a point or ſpeck, *viz.* the embryo plantule, which being acted on by the warmth of the ſun and of the earth, begins to protrude its radicle, or root, downwards, and its bud upwards; and as the requiſite heat continues, it draws nouriſhment by the root, and ſo continues to unfold itſelf and grow. See the article VEGETATION.

The two placentulæ, or cotyledons of a ſeed are, as it were, a caſe to the little embryo plant; covering it up, and ſheltering it from injuries, and feeding it from their own proper ſubſtance; which the plantule receives, and draws to itſelf by an infinite number of little filaments, which it ſends into the body of the placenta.

The cotyledons for the moſt part, abound with a balſam diſpoſed in proper cells; and this ſeems to be oil brought to its greateſt perfection, while it remains tumid, and lodged in theſe repoſitories: one part of the compoſition of this balſam is oily and tenacious, and ſerves to defend the embryo from any extraneous moiſture; and, by its viſcidity, to entangle and retain the fine, pure, volatile ſpirit, which is the ultimate production of the plant. This oil is never obſerved to enter into the veſſels of the embryo, which are too fine to admit ſo thick a fluid. The ſpirit, however, being quickened by an active power, may poſſibly breathe a vital principle into the juices that nouriſh the embryo, and ſtamp upon it the character that diſtinguiſhes the family; after which every thing is changed into the proper nature of that particular plant.

Now, when the ſeed is committed to the earth, the placenta ſtill adheres to the embryo for ſome time, and guards it from the acceſs of noxious colds, *&c.* and even prepares and purifies the cruder juice the young plant is to receive from the earth, by ſtraining it through its own body. This it continues to do, till the embryo-plant being a little enured to its new element, and its root tolerably fixed in the ground, and fit to abſorb the juice thereof, it then periſhes, and the plant may be ſaid to be delivered; ſo that nature obſerves the ſame method in plants contained in fruits, as in animals in the mother's womb.

To explain this proceſs of nature, let A, B, (plate CCXLIV. fig. 1.) be the two lobes, or cotyledons, of a bean ſlit open, and connected together by little white ſprigs in O; in each lobe are ſeen the branches, *a*, *a*, *a*, of the ſeed-roots, *e*, *e*, which feed the little bud or ſprout, *f*, with the pulp, or matter of the bean, till the earth root O C is capable of penetrating the earth, and extending its branches ſufficiently to extract nouriſhment from the earth, both for itſelf and the plant it is to ſuſtain. See the article VEGETATION.

Many ſorts of ſeeds will continue good for ſeveral years, and retain their vegetative faculty; whereas others will not grow after they are one year old; this difference is in a great meaſure owing to their abounding more or leſs with oil; as alſo to the nature of the oil, and the texture of their outward covering. All ſeeds require ſome ſhare of freſh air, to keep the germen in an healthy ſtate; and where the air is abſolutely excluded, the vegetative quality of the ſeeds will be ſoon loſt. But ſeeds will be longeſt of all preſerved in the earth, provided they are buried ſo deep as to be beyond the influence of the ſun and ſhowers; ſince they have been found to lie thus buried twenty or thirty years, and yet vegetate as well as new ſeeds. How the vegetative life is ſo long preſerved, by burying them ſo deep in the ground, is very difficult to explain; but as the fact is very well known, it accounts for the production of plants out of earth taken from the bottom of vaults, houſes, *&c.*

In the common method of ſowing ſeeds, there are many kinds which require to be ſown ſoon after they are ripe; and there are many others which lie in the ground a year, ſometimes two or three years, before the plants come up: hence when ſeeds brought from diſtant countries are ſown, the ground ſhould not be diſturbed, at leaſt for two years, for fear of deſtroying the young plants.

As to the method of preſerving ſeeds, the dry kinds are beſt kept in their pods

or outer coverings; but the ſeeds of all ſoft fruits, as cucumbers, melons, &c. muſt be cleanſed from the pulp and mucilage which ſurround them, otherwiſe the rotting of theſe parts will corrupt the ſeeds.

When ſeeds are gathered, it ſhould always be done in dry weather; and then they ſhould be hung up in bags in a dry room, ſo as not to deprive them of air.

Diſpenſatory-writers divide the ſeeds uſed in medicine into four claſſes: 1. The four greater hot ſeeds, *viz.* of aniſeed, fennel, caraway, and cummin. 2. The four leſſer hot ſeeds, *viz.* of biſhop's-weed, ſtone-parſley, ſmallage, and wild carrot. 3. The four greater cold ſeeds, *viz.* cucumber, cucurbit, citruls, and melons. 4. The four leſſer cold ſeeds, *viz.* endive, ſcariola, lettuce, and purſlain. See ANISE, FENNEL, &c.

But beſides theſe, there are many other ſeeds preſcribed for their medicinal virtues; as thoſe of coriander, dill, thlaſpi, muſtard, linſeed, fœnugreek, carthamus, navew, ricinus, ſorrel, pſyllium, ſtaveſacre, &c. See CORIANDER, &c.

Change of SEED. See CHANGE.

Seed-wheat ſhould be bought from the crop on a ſtrong clay-land, whatever kind of land it is to be ſowed upon. A white clay is a good change for a red clay, and a red clay for a white; but whatever the land be, from which the ſeed is taken, it may be infected, if that be not changed there the preceding year; and then there may be danger, though it be had from ever ſo proper a land. It is a rule among the farmers, never to buy ſeed-wheat from a ſandy ſoil; they expreſs their diſlike of this by the coarſe rhime; ſand is a change for no land.

Steeping of SEED. See SMUT.

SEEDLINGS, among gardiners, denote ſuch roots of gilliflowers, &c. as come from ſeed ſown. Alſo the young tender ſhoots of any plants that are newly ſown.

SEEDY, in the brandy-trade, a term uſed by the dealers, to denote a fault that is found in ſeveral parcels of french brandy, which renders them unſaleable. The French ſuppoſe that theſe brandies obtain the flavour which they expreſs by this name, from weeds that grow among the vines from whence the wine of which this brandy is made was preſſed. However it be, the thing is evident, and the taſte not of any one kind, ſome taſting ſtrongly of aniſeed, ſome of caraway-ſeed, and ſome others of the ſtrong flavoured ſeeds of plants. The buſineſs of rectification of ſpirits, Dr. Shaw obſerves, is very little underſtood abroad, though much practiſed with us; and there is no doubt but that the ſame means which we uſe to rectify malt ſpirits, would alſo ſerve to purify theſe brandies. See the article RECTIFICATION.

SEEING, the act of perceiving objects by the organ of ſight; or it is the ſenſe we have of external objects by means of the eye. See the article SIGHT.

The apparatus, or diſpoſition, of the parts neceſſary to ſeeing, as alſo the obſtruction of that ſenſe from whatever cauſe, may be ſeen under the article EYE, and the manner wherein ſeeing is performed under the article VISION.

SEELING, in the manege, a horſe is ſaid to ſeel when he begins to have white eye-brows, that is, when there grows on that part about the breadth of a farthing of white hairs, mixed with thoſe of his natural colour, which is a mark of old age. It is ſaid, that a horſe never ſeels till he is fourteen years old, and always does before he is ſixteen years. The light, ſorrel, and black ſooner ſeel than any other. Horſe-jockeys uſually pull out thoſe hairs with pincers, but if there be ſo many, that it cannot be done without making the horſe look bald and ugly, then they colour their eye-brows, that they may not appear old.

SEELING, at ſea, is uſed in the ſame ſenſe nearly with heeling: when a ſhip lies down conſtantly, or ſteadily on one ſide, the ſeamen ſay, ſhe heels, and they call it ſeeling when ſhe tumbles violently and ſuddenly, by reaſon of the ſea forſaking her, as they call it, that is, the waves leaving her for a time in a bowling ſea. When a ſhip thus tumbles to leeward, they call it leeſeel, and in this there is not much danger, even in a ſtorm, becauſe the ſea will eaſily right her up again; but if ſhe rowls or ſeels to windward, there is fear of her coming over too ſhort or ſuddenly, and ſo having the ſea break right into her, be either foundered, or have ſome of her upper works carried away.

SEES, a city of France, in the province of Normandy, ſituated eaſt long. 20′, north lat. 49° 46′.

SEGEBERG, a town of Germany, in the circle of lower Saxony, and dutchy of Holſtein,

Holſtein, ſituated twenty-ſeven miles north-eaſt of Hamburg.

SEGEDIN, a city of upper Hungary, ſituated on the river Teyſſe, in eaſt long. 21°, north lat. 46° 21′.

SEGESWAEE, a city of Tranſylvania, ſituated eaſt long. 24°, north lat. 47° 25′.

SEGMENT *of a circle*, in geometry, that part of the circle contained between a chord and an arch of the ſame circle. See CIRCLE, ARCH, and CHORD.

Thus the portion AFB (plate CCXLIV. fig. 2. n° 1.) comprehended between the arch AFB, and the chord, AB is a ſegment of the circle ABFD. As it is evident every ſegment of a circle muſt either be greater or leſs than a ſemicircle, the greater part of the circle cut off by a chord, *i. e.* the part greater than a ſemicircle, is called the greater ſegment, as ADEB, and the leſſer part, or the part leſs than a ſemicircle, the leſſer ſegment, as AFB.

From what has been ſaid under CIRCLE it appears, that the area of the ſector ABCD, n° 2. is produced by multiplying half of the arch into the radius, and likewiſe that the area of the ſegment ADC is found by ſubtracting from the area of the ſector, the area of the triangle ABC. See SECTOR.

SEGMENT *of a ſphere*, is a part of a ſphere terminated by a portion of its ſurface, and a plane which cuts it off, paſſing ſomewhere out of the center; being more properly called the ſection of a ſphere.

The baſe of ſuch a ſegment, it is evident, is always a circle for finding the ſolid contents of the ſegment of a ſphere. See the article FRUSTUM.

SEGMENT is ſometimes alſo extended to the parts of the ellipſes, and other curvilinear figures.

Line of SEGMENTS. See SECTOR.

SEGMENTUM, among the Romans, an ornament of lace, uſed by the women on their ſhoulders, which according to ſome, reſembled our ſhoulder-knots.

Segmenta, were alſo a kind of teſſelated or moſaic pavements, made up of pieces of various ſhapes and colours, but which had an uniform and regular arrangement.

SEGMOIDAL, *valves*, in anatomy, little valves of the pulmonary artery, thus called from their reſembling ſegments of circles, but more uſually called ſemilunar valves.

SEGORBE, a city of Spain, in the province of Valencia, ſituated thirty miles north-weſt of Valencia.

SEGOVIA, a city of Manila, the largeſt of the Philippine Iſlands, ſituated in eaſt long. 119°, north lat. 18° 30′.

This is alſo the name of a city of Spain, in the province of Old Caſtile, ſituated weſt long. 4° 35, north lat. 41°.

SEGRA, a river of Spain, which riſing in the north of Catalonia, and running ſouth-weſt, diſcharges itſelf into the Ebro, at Miquinença.

SEGREANT, is the herald's word for a griffon, when drawn in a leaping poſture, and diſplaying his wings as if ready to fly.

SEGUE, in the italian muſic, is often found before *aria*, *alleluja*, *amen*, &c, to ſhew that thoſe portions or parts are to be ſung immediately after the laſt note of that part over which it is writ; but if theſe words *ſi piace*, or *ad libitum*, are joined therewith, it ſignifies, that theſe portions may be ſung or not, at pleaſure.

SEGURA, a town of Portugal, in the province of Beira, ten miles north-weſt of Alcantara. This is alſo the name of a town in Spain, in the province of New Caſtile, and territory of La Mancha, ſituated among the mountains of Segura, weſt long. 2° 50′, north lat. 38° 25′.

SEJANT, a term uſed in heraldry, when a lion, or other beaſt, is drawn in an eſcutcheon, ſitting like a cat, with his fore-feet ſtrait.

SEIGNIORY, *dominium*, in our law, is uſed for a manor or lordſhip of a ſeigneur, or lord of the fee or manor.

SEIGNORAGE, ſignifies the right, or due belonging to a ſeigneur, or lord; but it is particularly uſed for a duty belonging to the prince, for the coining of money; called alſo coinage, which under our antient kings, was five ſhillings for every pound of gold brought in the maſs to be coined, and a ſhilling for every pound weight of ſilver. At preſent the king claims no ſeignorage at all, but the ſubject has his money coined at the public expence; nor has the king any advantage therefrom, but what he has from the alloy. See COINING.

SEISIN, in law, ſignifies poſſeſſion. See the article POSSESSION.

In this ſenſe we ſay, premier ſeiſin, for the firſt poſſeſſion, *&c.* See PREMIER.

Seiſin is divided into that in deed or in fact, and that in law; a ſeiſin in deed is where

where a poſſeſſion is actually taken; but a ſeiſin in law is, where lands deſcend, and the party has not entered thereon; or in other words, it is, where a perſon has a right to lands, *&c.* and is by wrong diſſeiſed of them. A ſeiſin in law is held to be ſufficient to avow on; though to the bringing of an aſſiſe, actual ſeiſin is required; and where ſeiſin is alledged, the perſon pleading it, muſt ſhew of what eſtate he is ſeiſed, *&c.* See the article LIVERY *of ſeiſin*.

Seiſin of a ſuperior ſervice, is deemed to be a ſeiſin of all inferior and caſual ſervices, that are incident thereto; and ſeiſin of a leſſee for years, is ſufficient for him in reverſion.

SEISINA HABENDA QUIA REX HABUIT ANNUM, DIEM ET VASTUM, a writ which lies for delivery of ſeiſin to the lord of lands or tenements, forfeited by a felon, after the king, in right of his prerogative, has had the year, day, and waſte therein.

SEISINAM HABERE FACIAS. See the article HABERE.

SEISOR. See the article DISSEISOR.

SEIZE, SEAZE, or SEASE, in the ſea-language, is to make faſt, or bind, particularly to faſten two ropes together, with rope-yarn. The ſeizing of a boat is a rope tied to a ring, or little chain in the foreſhip of the boat, by which means it is faſtened to the ſide of the ſhip.

SEIZING, in falconry, is when a hawk gripes her prey, or any thing elſe faſt between her claws.

SEIZURE, in commerce, an arreſt of ſome merchandize, moveable, or other matter, either in conſequence of ſome law, or of ſome expreſs order of the ſovereign. Contraband goods, thoſe fraudulently entered, or landed without entering at all, or at wrong places, are ſubject to ſeizure. In ſeizures, among us, one half goes to the informer, and the other half to the king.

SELAGINOIDES, in botany, a name whereby ſome authors call the lycopodium. See LYCOPODIUM.

SELAGO, in botany, a genus of the *didynamia-angioſpermia* claſs of plants, the corolla whereof is monopetalous; the tube is very ſmall, and ſcarcely perforated; the limb is patent, quinquifid, and almoſt equal; there is no pericarpium, the corolla inveſting the ſeed, which is ſingle and roundiſh.

SELAGO, is alſo a ſynonymous name for the lycopodium. See LYCOPODIUM.

SELBY, a town of Yorkſhire, ſituated ten miles ſouth of York.

SELENDERS, in the manege, are chops, or mangy ſores, in the bending of a horſe's hough, as the malanders are in the knees. See MALANDERS.

SELENEUSIAN EARTH, in natural hiſtory, a looſe, friable light and white marle, called by late authors, mineral-agaric. See AGARIC.

SELENITÆ, MOON STONE, in natural hiſtory, a claſs of foſſils, naturally and eſſentially ſimple, not inflammable nor ſoluble in water, compoſed of ſlender filaments, ranged into fine and even thin flakes, and thoſe diſpoſed into regular figures, in the different genera, approaching to a rhomboide, a hexangular column, or a rectangled inequilateral parallelogram, fiſſil like the talcs, but that not only horizontally, but perpendicularly alſo, flexile in a ſmall degree, but not at all elaſtic; not fermenting with acid menſtrua, and readily calcining in the fire.

Of this claſs, Dr. Hill makes ſeven orders, and under theſe orders ten genera. The firſt order is the ſelenitæ, with horizontal plates, approaching to a rhomboidal form; the ſecond order is the ſelenitæ with horizontal plates, of a columnar and angular form; the third order comprehends thoſe ſelenitæ whoſe filaments are viſibly arranged into plates, but in the whole maſſes appear ſtriated, not tabulated; of the fourth order, are the flat ſelenitæ, of no determinately angular figure; of the fifth order, are the ſelenitæ formed of plates perpendicularly arranged; of the ſixth order are thoſe ſelenitæ formed of a congeries of plates, ranged in form of a ſtar; and of the ſeventh order are thoſe ſelenitæ of a complex and indeterminate figure. This foſſile is found in ſtrata of clay uſually of the blue tough kind; we have it in many parts in England, particularly about Shotover hills in Oxfordſhire; in ſeveral places of Northamptonſhire, Leiceſterſhire, and about Epſom, in Surry. In medicine, it is a very powerful aſtringent, and is of effect in diarrhœas, dyſenteries, and hæmorrhages of all kinds. It ſtands alſo recommended as a coſmetic. The people of Northamptonſhire call it ſtaunch, and uſe it in hæmorrhages of all kinds, with ſucceſs.

SELENOGRAPHY, a branch of coſmography, which deſcribes the moon and all the parts and appearances thereof, as

geography does thoſe of the earth. See the article MOON.

SELEUCIDÆ, in chronology. Æra of the ſeleucidæ, or the ſyro-macedonian æra, is a computation of time, commencing from the eſtabliſhment of the ſeleucidæ, a race of greek kings, who reigned as ſucceſſors of Alexander the Great, in Syria, as the Ptolomies did in Egypt. This æra we find expreſſed in the book of the Maccabees, and on a great number of greek medals, ſtruck by the cities of Syria, *&c.* The Rabbins call it the æra of contracts; and the Arabs therik dilkarnain, that is, the æra of the two horns. According to the beſt accounts, the firſt year of this æra falls in the year 311 before Chriſt, being twelve years after Alexander's death.

SELINGENSKOY, a town of Aſiatic Muſcovy, in the province of Siberia, ſituated on the road from Tobolſki to China, on the river Selinga: in eaſt long. 95°, north lat. 50°.

SELINUM, in botany, a genus of the *pentandria digynia* claſs of plants, the general corolla whereof is uniform; the ſingle flowers conſiſt each of five unequal inflexo-cordated petals; there is no pericarpium: the fruit is of an elliptico-oblong, compreſſo-plane figure, ſtriated each way in the middle, and ſeparable into two parts; the ſeeds are two, of an oblong elliptic figure, plane on each ſide, and edged with membranaceous rims at the ſides.

SELKIRK, a borough town of Scotland, in the county of Tweedale, ſituated thirty-two miles ſouth of Edinburgh.

SELL, in building, is of two kinds, *viz.* ground-ſell, which denotes the loweſt piece of timber, in a timber-building, and that on which the whole ſuperſtructure is raiſed; and the window-ſell, called alſo window-ſoil, is the bottom piece in a window-frame.

SELLA EQUINA, TURCICA, or SPHENOIDES, a name given to the four apophyſes of the os ſphenoides, or cruciforme, in the brain, in regard of their forming a reſemblance of a ſaddle, which the Latins call *ſella*. They are ſometimes called by the greek name *clinoides*. Herein are contained the pituarity gland, and in ſome animals, the rete mirabile.

SEMEIOTICA, or SEMEIOSIS, σημειωτικη, that part of medicine which conſiders the ſigns or indications of health and diſeaſes, and enables the phyſician to judge what is, was, or will be, the ſtate, degree, order, and effect, of health or ſickneſs.

SEMENDRIA, a town of european Turky, in the province of Servia, ſituated on the Danube, thirty miles ſouth-eaſt of Belgrade.

SEMENTINÆ FERIÆ, in antiquity, feaſts held annually among the Romans, to obtain of the gods a plentiful harveſt. They were celebrated in the temple of Tellus, where ſolemn ſacrifices were offered to Tellus and Ceres. Theſe feaſts were held about ſeed-time, uſually in the month of January; for Macrobius obſerves, they were moveable feaſts. They had their name from *ſemen*, ſeed.

SEMETS, SUMMETS, or SUMMITS, in botany, the ſame with the antheræ. See the article ANTHERÆ.

SEMI, a word borrowed from the latin, ſignifying *half*, but only uſed in compoſition with other words, as in the following articles.

In muſic, ſemi has three ſeveral uſages; firſt, when prefixed to the name of a note, it expreſſes a diminution of half its value, as in ſemi-breve, *&c.* Secondly, when added to the name of an interval, it expreſſes a diminution, not of half, but of a leſſer ſemi-tone, or four commas in the whole compaſs, as in ſemi-diapente, *&c.* Thirdly, it ſometimes alſo ſignifies an imperfection, thus, ſemi-circolo, or circolo-mezzo, ſignifies an imperfect circle, which is the mark of imperfect time, that is, of double time; whereas the circle being a character of perfection, marks triple time.

Semi-breve is a note or meaſure of time, comprehending the ſpace of two minims, or four crotchets, or half a breve. See MINIM, CROTCHET, *&c.*

The ſemi-breve is accounted one meaſure or time, or the integer in fractions and multuples, whereby the time of the other notes is expreſſed: thus a minim is expreſſed by $\frac{1}{2}$, a crotchet by $\frac{1}{4}$, *&c.* that is, by $\frac{1}{2}$ of a meaſure or ſemi-breve; a breve by two, and a long by four; that is, by four meaſures or ſemi-breves.

For the ſemi-chroma, ſee the articles CHROMA and QUAVER. For the ſemi-circolo ſee CIRCOLO-MEZZO. For the ſemi-diapaſon, ſemi-diapente, ſemi-diateſſaron, ſee DIAPASON, DIAPENTE, *&c.* And for the ſemi-tone and ſemi-tonic, ſee SEMI-TONE and SEMI-TONIC.

For

For the ſeveral characters of the ſemi-breve, *&c.* ſee the article CHARACTER.

SEMI-ARIANS, in church-hiſtory, a branch of the antient arians, conſiſting of ſuch as in appearance condemned the errors of that hereſiarch, but yet acquieſced in ſome of the principles thereof, only palliating and concealing them under ſofter and more moderate terms. They would not allow, with the catholics, that the ſon was homoouſios, *i. e.* of the ſame ſubſtance, but homoiouſios, *i. e.* of a like ſubſtance, with the father; and thus, though, in expreſſion, they differed from the orthodoxy in a ſingle letter only, yet, in effect, they denied the divinity of Jeſus Chriſt, and placed him in the rank of creatures.

SEMI-CIRCLE, in geometry, half a circle, or that figure comprehended between the diameter of a circle and half the circumference. See CIRCLE.

SEMI-CIRCLE is alſo an inſtrument uſed in ſurveying, otherwiſe called graphometer. See GRAPHOMETER.

SEMI-COLON, in grammar, one of the points or ſtops uſed to diſtinguiſh the ſeveral members of ſentences from each other. See PUNCTUATION.

The mark, or character, of the ſemi-colon is (;) and has its name as being ſomewhat of leſs effect than a colon, or as demanding a ſhorter pauſe. The uſe of the ſemi-colon, the grammarians generally ſay, is to mark a ſenſe leſs complete than the colon, and more complete than a comma; but this conveys a very obſcure idea: beſides, our beſt writers ſeem to uſe them promiſcuouſly. See COLON.

But Mr. Ward, who is ſaid to have firſt ſettled a juſt uſe of the ſemi-colon, holds, that it is properly uſed to diſtinguiſh the conjunct members of ſentences. Now by a conjunct member of a ſentence, he means ſuch a one as contains at leaſt two ſimple members. Whenever then a ſentence can be divided into ſeveral members of the ſame degree, which are again diviſible into other ſimple members, the former are to be ſeparated by a ſemi-colon. But though the proper uſe of the ſemi-colon be to diſtinguiſh conjunct members, it is not neceſſary that all the members divided hereby be conjunct; for upon dividing a ſentence into great and equal parts, if one of them be conjunct, all thoſe other parts of the ſame degree are to be diſtinguiſhed by a ſemi-colon. See SENTENCE, *&c.*

SEMI-CUBICAL *parabola*, in the higher geometry, a curve of the ſecond order, wherein the cubes of the ordinates are as the ſquares of the abſciſſes. Its equation is $axx = y^3$.

SEMI-CUPIUM, in medicine, an half-bath, wherein the patient is only placed up to the navel.

SEMI-DIAMETER, half the diameter, or a right line drawn from the center of a circle, or ſphere, to its circumference; being the ſame with what is otherwiſe called the radius. See RADIUS.

The diſtances, diameters, *&c.* of the heavenly bodies, are uſually eſtimated, by aſtronomers, in ſemi-diameters of the earth; and the diſtances of the ſecondary planets from their reſpective primary ones, by ſemi-diameters of the body of the primary planet. See DISTANCE, DIAMETER, and PLANET.

SEMI-DOUBLE, in the romiſh breviary, a term applied to ſuch offices and feſtivals as are celebrated with leſs ſolemnity than the double ones, but yet with more than the ſingle ones. The ſemi-double office has double veſpers, and nine leſſons at mattins, but the anthems are not re-doubled. It is performed on Sundays, on the octaves; and on feaſts, marked for ſemi-double in the calendar.

SEMIFLOSCULOUS, in botany, a term uſed to expreſs the flowers of a certain claſs of plants, of which the dandelion, hawk-weed, and the like, are kinds. Theſe ſemifloſcules are petals, hollow in their lower part, but in their upper flat, and continued in the ſhape of a tongue. See FLOSCULOUS.

SEMIGALIA, the eaſtern diviſion of the dutchy of Courland in Poland.

SEMI-INTEROSSEUS INDICIS, in anatomy, a ſmall, ſhort, flat muſcle, very like the antithenar, or internal ſemi-interoſſeus of the thumb. It is ſituated obliquely on one ſide of that of the thumb, between the firſt phalanx thereof and the firſt metacarpal bone. It is fixed by one end to the outſide of the baſis of the firſt phalanx of the thumb, and by the other end it is fixed near the head of the firſt phalanx of the index, on that ſide next the thumb.

SEMI-LUNAR VALVES, in anatomy, are three ſmall valves, or membranes, of a ſemi-lunar figure, placed in the orifice of the pulmonary artery, to prevent the re-

lapſe of the blood into the heart at the time of its dilatation. See the article HEART.

SEMI-MEMBRANOSUS, in anatomy, a long, thin muſcle, partly tendinous; ſituated on the backſide of the thigh, a little towards the inſide; being one of the five flexors of the tibia. It ariſes from the tubercle of the iſchium.

SEMI-ORDINATE, in conics, *&c.* the half of an ordinate. See ORDINATE.

SEMI-PARABOLA, in geometry, a curve defined by the equation $ax^{m-1}=y^m$; as $ax^2=y^3$, and $ax^3=y^4$. See the article PARABOLA.

In ſemi-parabolas, $y^m : v^m :: ax^{m-1} : az^{m-1} = x^{m-1} : z^{m-1}$; or the powers of the ſemi-ordinates are, as the powers of the ſemi-abſciſſes one degree lower; for inſtance, in cubical ſemi-parabolas the cubes of the ordinates are as the ſquares of the abſciſſes; that is, $y^3 : v^3 :: x^2 : z^2$.

SEMI-PELAGIANS, in church-hiſtory, a branch of the pelagians, ſo called becauſe they pretended to keep a medium between the pelagians and the orthodox. See the article PELAGIANS.

SEMI-PROOF, or HALF-PROOF, in matters of law. See PROOF.

SEMI-QUARTILE, or SEMI-QUADRATE, the ſame with octant. See the article OCTANT.

SEMI-QUAVER, in muſic. See QUAVER.

SEMI-QUINTILE, an aſpect of the planets when thirty-ſix degrees from each other. See the article ASPECT.

SEMI-SEXTILE, marked S. S. is an aſpect of two planets when diſtant only thirty degrees.

SEMI-TONE, in muſic, one of the degrees or concinnous intervals of concords. The ratio of the ſemi-tone is 15 : 16. See the article TONE.

SENI-TONIC *ſcale*, a ſcale, or ſyſtem of muſic, conſiſting of twelve degrees in the octave, being an improvement of the diatonic-ſcale, by inſerting between each two notes thereof another note, which divides the interval or tone into two unequal parts called ſemi-tones. See the article DIATONIC.

SEMINAL, *ſeminalis*, in anatomy and medicine, ſomething belonging to the ſemen, or ſeed. See the articles SEED and SPERMATIC.

SEMINARY, a kind of college, or ſchool, where youth are inſtructed in the ceremonies, *&c.* of the ſacred miniſtry, of which there are many abroad; it being ordained, by the council of Trent, that there be a ſeminary belonging to each cathedral, under the direction of the biſhop.

In the reign of queen Elizabeth, the roman catholics projected the founding engliſh ſeminaries abroad, in order from thence to be furniſhed with miſſionaries to perpetuate and increaſe their communion in Britain. But, by a ſtatute of that princeſs, it is made a premunire to contribute to the maintenance of a popiſh ſeminary: and by one of James I. no perſons are to go, or be ſent, to popiſh ſeminaries, to be inſtructed or educated, under divers penalties and diſabilities mentioned in the ſtatute.

SEMINARY, in gardening, denotes the ſeed-plot, or place allotted for raiſing plants from ſeed, and keeping them till they are fit to be removed into the garden or nurſery.

When the ſeminary is intended for trees, it muſt be large, and of a ſoil adapted to the generality of the trees intended to be raiſed in it: but that which is moſt in uſe is for the ſupply of the flower-garden, and is the place where flowers are to be raiſed from their ſeeds, to procure varieties; or, as the floriſts expreſs it, new flowers; as alſo for the ſowing all the biennial plants, to ſucceed thoſe which decay in the flower-garden.

The ſeminary ſhould always be ſituated at ſome diſtance from the houſe, and be walled or paled round, and kept under lock and key, to keep out dogs, *&c.* and to prevent a great deal of damage that is frequently done by thoſe who are not acquainted with gardening, before they are aware of it. The ſeveral directions for the management of the ſeminary, are to be ſeen under the names of the ſeveral plants intended to be raiſed in it.

SEMINATION, in natural hiſtory, denotes the manner, or act, of ſhedding and diſperſing the ſeeds of plants, which is effected ſeveral ways. Some are heavy enough to fall directly to the ground; others are furniſhed with a pappus, or down, that they may, by means thereof, be diſperſed by the wind; and others again are contained in elaſtic capſules, which burſting open with conſiderable force, dart or throw out the ſeeds to different diſtances.

SEMINERVOSUS, in anatomy, one of the flexor muſcles of the leg, which ariſes from the iſchium, and is inſerted into the upper part of the tibia.

SEMIS, in roman antiquity, the half of an as. See the article As.

SEMISPINALIS, or Semispinosus, in anatomy, one of the extenſor muſcles of the back and loins, has its origin from the os ſacrum and vertebræ of the loins, and its termination at the upper vertebræ of the thorax, eſpecially at their ſpinoſe apophyſes: it coheres very firmly to the longiſſimus dorſi and ſacro-lumbaris, the other two extenſors of the back and loins.

SEMITA luminosa, a name given to a lucid tract in the heavens, which may be ſeen about ſix o' clock at night, a little before the vernal equinox, extending from the weſtern edge of the horizon up towards the pleiades.

Caſſini and Facio have both obſerved this phænomenon; the former thinks it ariſes from a vaſt number of ſmall planets encompaſſing the ſun, which give this light from reflection.

SEMLIN, or Zemlin, a town of Sclavonia, ſubject to the houſe of Auſtria, eaſt long. 21°, and north lat. 45°.

SEMPERVIVUM, in botany, a genus of the *dodecandria-polygynia* claſs of plants, the corolla whereof conſiſts of twelve oblong, lanceolated, acute, hollow petals, a little larger than the cup; the fruit conſiſts of twelve oblong compreſſed capſules, placed in an orbicular order, acuminated outwards, and opening internally; the ſeeds are numerous, roundiſh, and ſmall.

This genus comprehends the great houſeleek and the tree-houſeleek.

This plant ſtands recommended as a cooler; though its ſenſible qualities diſcover no great foundation for any virtue of this kind.

SEMUR, the name of two towns of Burgundy, in France, one thirty-four miles weſt of Dijon, and the other forty-ſix miles north-weſt of Lyons.

SENA, or Senna, in botany, a ſhrub with crooked and compreſſed fruit, and lanceolated pinnæ: it is a ſpecies of caſſia. See the article Cassia.

Sena-leaves are much uſed for their purgative virtue; but are apt to gripe, unleſs given with proper correctives, as coriander, aniſeed, ginger, raiſins, and ſalt of tartar; which are added to the infuſion of the leaves, occaſionally: but there is no corrective ſo effectual, as diluting it with a large quantity of the liquid its infuſion is taken in, as broth or water-gruel. This, and the method of correcting it by the alkaline ſalts, are the only proper ones; becauſe they have it in full force as a purgative, and indeed rather add to it than otherwiſe. In inflammatory caſes, hæmorrhages, and diſorders of the breaſt, ſena is to be avoided as a purge; but, in all other caſes, it is a ſafe and excellent cathartic.

The pods of ſena are alſo purgative, and are obſerved to gripe the patient leſs; but then they alſo purge leſs, ſo that they require to be given in a much larger doſe, and even then operate but languidly.

SENATE, *ſenatus*, in general, is an aſſembly, or council, of ſenators; that is, of the principal inhabitants of a ſtate, who have a ſhare in the government.

The ſenate of antient Rome is, of all others, the moſt celebrated: it exerciſed no contentious juriſdiction, but appointed judges, either from among the ſenators or knights, to determine proceſſes: it alſo appointed governors of provinces, and diſpoſed of the revenues of the commonwealth, *&c.* Yet did not the whole ſovereign power reſide in the ſenate, ſince it could not elect magiſtrates, make laws, or decide of war and peace; in all which caſes the ſenate was obliged to conſult the people.

According to Dr. Middleton, the conſtant and regular ſupply of the ſenate was from the annual magiſtrates; who, by virtue of their ſeveral offices, acquired a right to ſit and vote in that aſſembly: the uſual gradation of theſe offices being that of quæſtor, tribune of the people, ædile, prætor, and conſul. See the articles Quæstor, Tribune, *&c.*

But though theſe offices gave both an immediate right, and actual entrance into the ſenate; yet the ſenatorial character was not eſteemed complete, till the new ſenators had been enrolled by the cenſors, at the next general luſtrum, or review of all the orders of the city. See the articles Censor and Lustrum.

The ſenate always met of courſe on the firſt of January, for the inauguration of the new conſuls; and in all months univerſally, there were three days, *viz.* the calends, nones, and ides, on which it regularly met: but it always met on extraordinary occaſions, when called together by conſul, tribune, or dictator.

SENATOR,

SENATOR, in general, denotes a member of ſome ſenate.

SENATUS AUCTORITAS, a vote of the roman ſenate, drawn up in the ſame form with a decree, but without its force, as having been hindred from paſſing into a decree, by ſome of the tribunes of the people.

SENATUS CONSULTUM, a decree of the roman ſenate, pronounced on ſome queſtion or point of law; which, when paſſed, made a part of the roman law. See the article CIVIL LAW.

SENECA, or SENEGA. See SENEGA.

SENECIO, GROUNDSEL, in botany, a genus of the *ſyngeneſia-polygamia-ſuperflua* claſs of plants, with a floſculous flower, contained in a one-leaved cup; there is a ſingle downy ſeed, after each floſcule.

Common groundſel, taken in a ſtrong infuſion, is emetic: it is preſcribed in ſmall doſes in the jaundice, dropſy, and hæmorrhages; and externally it is uſed in ointments, for diſorders of the ſkin.

SENEF, a town on the confines of Hainault, twelve miles eaſt of Mons.

SENEGA, or SENEGAL, a river of Negroland, in Africa, which falls into the Atlantic ocean, in 16° north lat. whence the gum ſenega is imported. See the article GUM.

SENEGA, SENECA, or SENEKA, RATTLESNAKE-ROOT, in the materia medica. See the article SERPENTARIA.

SENESCHAL, *ſeneſchallus*, a term antiently uſed for ſteward, or majordomo. See the article STEWARD.

SENEZ, a town of Provence, in France, forty-ſix miles north-eaſt of Aix.

SENLIS, a town of the Iſle of France, twenty-ſix miles north of Paris.

SENNA, or SENA. See SENA.

SENNE, a river of the auſtrian Netherlands, which, riſing in Hainault, paſſes by Bruſſels, and falls ito the Demer, below Mechlin.

SENOPLE, or SINOPLE. See the article SINOPLE.

SENORIA, in botany, a name uſed by ſome for the bonana-tree.

SENS, a town of Champain, in France, ſituated on the river Yonne, ſixty miles ſouth-eaſt of Paris.

SENSATION, in philoſophy, the act of perceiving external objects, by means of the ſenſes. See the articles SENSE and PERCEPTION.

SENSE, a faculty of the ſoul, whereby it perceives external objects, by means of the impreſſions they make on certain organs of the body. Theſe organs of ſenſation are commonly reckoned five, *viz.* the eye, whereby we ſee objects; the ear, which enables us to hear ſounds; the noſe, by which we receive the ideas of different ſmells; the palate, by which we judge of taſtes; and the cutis, or ſkin, which enables us to feel the different forms, hardneſs, or ſoftneſs of bodies. See the articles EYE, EAR, *&c.* alſo VISION, HEARING, *&c.*

Some alſo give the name of internal ſenſes to the determinations of the mind to be pleaſed with certain forms and ideas, perceived by the means of corporeal organs of ſenſe; and hence they uſe the term moral ſenſe, for a determination of the mind to be pleaſed with the contemplation of thoſe affections, actions, or characters, which we call virtuous.

SENSITIVE SOUL, a denomination given to the ſouls of brutes, either as intimating its utmoſt faculty to be that of ſenſation; or becauſe it is ſuppoſed to be corporeal, ſo as to be an object of our ſenſes. See the article SOUL.

SENSITIVE PLANT, *mimoſa*, in botany, a genus of the *polyandria-monogynia* claſs of plants, with a ſmall, funnel-faſhioned, ſemi-quinquifid flower: its fruit is a long pod, containing a great many roundiſh ſeeds.

This genus comprehends the mimoſa or ſenſitive plant, the acacia of Tournefort, and the inga of Plumier.

The ſenſitive plant is ſo denominated from its remarkable property of receding from the touch, and giving ſigns, as it were, of animal life and ſenſation: this motion it performs by means of three diſtinct articulations, *viz.* of a ſingle leaf with its pedicle, of the pedicle to its branch, and of the branch to the trunk or main ſtem; the primary motion of all which is the cloſing of the two halves of the leaf on its rib; then the rib or pedicle itſelf cloſes; and if the motion wherewith the plant is moved be very ſtrong, the very branches have the ſenſation propagated to them, and apply themſelves to the main ſtem, as the ſimple leaves did before to their ribs, and theſe ribs to their branches; ſo that the whole plant, in this ſtate, forms itſelf, from a very complexly branched figure, into a ſort of ſtraight cylindrical one.

SENSORY, *ſenſorium commune*, the ſeat of the common ſenſe, or what receives the impreſſions of all ſenſible objects, conveyed to it by the nerves of each particular

ticular organ, and conſequently is the immediate cauſe of perception. This office is, by Dr. Willis, attributed to the ſtriated part of the brain; and by Des Cartes to the glandula pinealis.

SENTENCE, in law, a judgment paſſed in court by the judge, on ſome proceſs, either civil or criminal.

SENTENCE, in grammar, a period or ſet of words, comprehending ſome perfect ſenſe or ſentiment of the mind. See the article POINTING.

SENTENCE, in poetry, is an inſtructive and lively remark made on ſomething very obſervable and agreeably ſurpriſing, which contains much ſenſe in few words.

It is either direct or plain, as, "In all the affairs of the world, ſo much reputation is really ſo much power;" or indirect or diſguiſed, as,

"Fool, not to think how vain
Againſt th'Omnipotent to riſe in arms."

This is a very dexterous and prevailing way of bringing in a ſentence. You are entertained with a noble reflection, when you did not expect it; and pleaſantly ſurprized and inſtructed, without the appearance or formality of art. Not to come down to uſeleſs nicety and diſtinction, a ſentence appears with moſt beauty and advantage, when it is put into ſome of theſe following forms.

1. When it is expreſſed in any way of exclamation, but peculiarly of wonder or indignation: as,

"How advantageous is it to paſs thro' adverſities, to the enjoyment of proſperity!"

"How ſharper than a ſerpent's tooth it is, to have a thankleſs child!"

2. When it is put into a moving expoſtulation, or preſſing interrogation.

"Are theſe our ſcepters? theſe our due rewards?
And is it thus that Jove his plighted faith regards?"

3. When the ſentence is delivered, and a reaſon immediately added to ſupport it.

"In a government, it is much better to be unmindful of good ſervices than bad; for a good man only becomes more ſlow, when you take no account of him; a bad man, more daring and inſolent."

4. When a ſentence is made up of a ſhort relation, and a clean and pertinent remark upon it.

"Meſſalina deſired the name of matrimony (with her adulterer Silius) purely for the greatneſs of the infamy; which is the laſt pleaſure of profligate people." And this is near a-kin to the epiphonema.

Sentences muſt not ſtand aukward and bulky out of the diſcourſe, but be neatly interwoven and wrought into it.

They muſt be unaffected and ſignificant, and ſuch as the ſubject eaſily ſuggeſts to a thoughtful and diſtinguiſhing man. Sentences are the ornaments and lights of a diſcourſe; and therefore, as lights and ſhades are in a good picture, ſo ought ſentences to be ſo exactly and judiciouſly mixed with the other parts of the diſcourſe, that all together may make up one uniform beauty, one regular and conſummate piece.

Epiphonema is an acclamation, containing a lively remark, placed at the end of a diſcourſe or narration. So Milton on the obſtinacy of the rebel angels, who were ſo infatuated, that they would not ſubmit, though they knew almighty power and majeſty came armed againſt them:

"In heav'nly minds can ſuch perverſeneſs dwell?"

This figure cloſes a narration in a very advantageous and taking manner; deeply impreſſes the thing related, upon the memory of the reader; and leave him in a good humour, well ſatisfied and pleaſed with the ſenſe and ſagacity of his author. See EPIPHONEMA.

SENTIMENTS, in poetry, and eſpecially dramatic, are the thoughts which the ſeveral perſons expreſs, whether they relate to matters of opinion, paſſion, buſineſs, or the like.

SENTINEL, CENTINEL, or CENTRY, in military affairs, is a private ſoldier, placed in ſome poſt, to watch any approach of the enemy, to prevent ſurprizes, and to ſtop ſuch as would paſs without order, or diſcovering who they are.

SEPARATION, a term ſomtimes uſed for what is more uſually called departure. See the article DEPARTURE.

SEPARATISTS, an appellation given to diſſenters, from their ſetting up a ſeparate church from the eſtabliſhed one. See the articles CHURCH and DISSENTERS.

SEPIA, the INK-FISH, or CUTTLE-FISH, in zoology, a genus of remarkable ſea-inſects, of an oblong figure, and depreſſed: it has ten tentacula, two of which are longer than the reſt, and are pedunculated.

There

There are ſeveral ſpecies of this animal, different in ſize and other properties: but that properly called the cuttle-fiſh is about ſix inches in length and three and a half in diameter; and is ſupported by an oblong, light, and ſpongy ſubſtance, of a friable texture, and lined with a light fungous pith: this is what our ſilver-ſmiths uſe, under the name of cuttle-bone; and is alſo uſed in tooth-powders, as a dentrifice. This animal is frequent in the european ſeas, but is not common on our coaſts: when in danger of being taken, it is ſaid to emit at its mouth a black liquor of a black colour, like ink, in a conſiderable quantity, which obſcures the water about it, and gives it an opportunity of eſcaping.

SEPS, in zoology, a ſpecies of lizard, with longitudinal black lines: its bite is ſaid to be very fatal. See LIZARD.

SEPTA OVILIA, in roman antiquity. See the article OVILIA.

SEPTARIÆ, in natural hiſtory, a large claſs of foſſils, commonly known by the names of ludus Helmontii and waxen veins.

They are defined to be foſſils not inflammable, nor ſoluble in water; of a moderately firm texture, and duſky hue, divided by ſeveral ſepta, or thin partitions, and compoſed of a ſparry matter greatly debaſed by earth, not giving fire with ſteel, fermenting with acids, and in great part diſſolved by them, and calcining in a moderate fire.

Of this claſs there are two diſtinct orders of bodies, and under thoſe ſix genera. The ſeptariæ of the firſt order are thoſe which are uſually found in large maſſes, of a ſimple uniform conſtruction, but divided by large ſepta either into larger and more irregular portions, or into ſmaller and more equal ones, called talc. The genera of this order are four: 1. Thoſe divided by ſepta of ſpar, called ſecomiæ. 2. Thoſe divided by ſepta of earthy matter, called gaiophragmia. 3. Thoſe divided by ſepta of the matter of the pyrites, called pyritercia. And, 4. Thoſe divided by ſepta of ſpar, with an admixture of cryſtal, called diaugophragmia. See all theſe under their ſeveral heads.

Thoſe of the ſecond order are ſuch as are uſually found in ſmaller maſſes, of a cruſtated ſtructure, formed by various incruſtations round a central nucleus, and divided by very thin ſepta. Of this order are only two genera: 1. Thoſe with a ſhort roundiſh nucleus, encloſed within the body of the maſs. And, 2. Thoſe with a long nucleus, ſtanding out beyond the ends of the maſs.

SEPTEMBER, the ninth month of the year, conſiſting of only thirty days: it took its name as being the ſeventh month, reckoning from March, with which the Romans began their year. See the articles YEAR and MONTH.

SEPTENTRIO, in aſtronomy, a conſtellation more uſually called urſa minor. See the article URSA.

In coſmography, the term ſeptentrio denotes the ſame with north: and hence, ſeptentrional is applied to any thing belonging to the north, as ſeptentrional ſigns, parallels, *&c.* See the articles SIGN, *&c.*

SEPTIER, or SETIER, a french meaſure of capacity. See MEASURE.

SEPTIZON, or SEPTIZONIUM, in roman antiquity, a celebrated mauſoleum, built by Septimus Severus, in the tenth region of the city of Rome: it was ſo called from *ſeptem* and *zona*, by reaſon it conſiſted of ſeven ſtories, each of which was ſurrounded by a row of columns.

SEPTUAGESIMA, in the calendar, denotes the third Sunday before lent, or before quadrageſima ſunday: ſuppoſed by ſome to take its name from its being about ſeventy days before eaſter.

SEPTUAGINT, the name given to a greek verſion of the books of the Old Teſtament, from its being ſuppoſed to be performed by ſeventy-two Jews, who are uſually called the ſeventy interpreters, becauſe ſeventy is a round number.

The hiſtory of this verſion is expreſly written by Ariſteas, an officer of the guards to Ptolemy Philadelphus, the ſubſtance of whoſe account is as follows: Ptolemy having erected a fine library at Alexandria, which he took care to fill with the moſt curious and valuable books from all parts of the world, was informed that the Jews had one, containing the laws of Moſes, and the hiſtory of that people, and being deſirous of enriching his library with a greek tranſlation of it, applied to the high-prieſt of the Jews; and to engage him to comply with his requeſt, ſet at liberty all the Jews, whom his father Ptolemy Soter had reduced to ſlavery. After ſuch a ſtep, he eaſily obtained what he deſired; Eleazar, the jewiſh high-prieſt, ſent back his embaſſadors,

doors with an exact copy of the moſaical law, written in letters of gold, and ſix elders of each tribe, in all ſeventy-two, who were received with marks of reſpect by the king, and then conducted into the iſle of Pharos, where they were lodged in a houſe prepared for their reception, and ſupplied with every thing neceſſary in abundance. They ſet about the tranſlation without loſs of time, and finiſhed it in ſeventy-two days; and the whole being read in the preſence of the king, he admired the profound wiſdom of the laws of Moſes; and ſent back the deputies, laden with preſents for themſelves, the high-prieſt, and the temple.

This verſion was in uſe to the time of our bleſſed Saviour, and is that out of which all the citations in the New Teſtament, from the Old, are taken. It was alſo the ordinary and canonical tranſlation made uſe of by the chriſtian church in the earlieſt ages; and it ſtill ſubſiſts in the churches both of the eaſt and weſt. It is however obſervable, that the chronology of the ſeptuagint is different from the hebrew text. See the article EPOCHA.

SEPTUM, in anatomy, an incloſure, or partition, a term applied to ſeveral parts of the body, which ſerve to ſeparate one part from another: as, 1. The ſeptum lucidum, or pellucidum, is a partition which ſeparates the upper ventricles of the brain, and is compoſed of a fine medullary ſubſtance, formed into two ſides, with a longitudinal cavity between them. 2. Septum cordis, a ſeparation between the two ventricles of the heart, which is about a finger thick, of the ſame ſubſtance with the heart itſelf, and conſiſting of muſcular fibres, which aſſiſt it in all its motions. For the ſeptum tranſverſum, ſeptum narium, ſeptum of the ſcrotum, &c. ſee DIAPHRAGM, NOSE, SCROTUM, &c.

SEPULCHRAL, ſomething belonging to ſepulchres, or tombs: thus a ſepulchral column is a column erected over a tomb, with an inſcription on its ſhaft; and ſepulchral lamps, thoſe ſaid to have been found burning in the tombs of ſeveral martyrs and others.

SEPULCHRE, a tomb, or place deſtined for the interrment of the dead. This term is chiefly uſed in ſpeaking of the burying places of the antients, thoſe of the moderns being uſually called tombs.

Sepulchres were held ſacred and inviolable, and the care taken of them has always been held a religious duty, grounded on the fear of God, and the belief of the ſoul's immortality. Thoſe who have ſearched or violated them, have been thought odious by all nations, and were always ſeverely puniſhed.

The Egyptians called ſepulchres, eternal houſes, in contradiſtinction to their ordinary houſes or palaces, which they called inns, on account of their ſhort ſtay in the one, in compariſon of their long abode in the other.

Regular canons of St. SEPULCHRE, a religious order, formerly inſtituted at Jeruſalem, in honour of the holy ſepulchre, or the tomb of Jeſus Chriſt.

Many of theſe canons were brought from the Holy Land into Europe, particularly into France, by Lewis the younger; into Poland, by Jaxa a poliſh gentleman; and into Flanders, by the counts thereof; many alſo came into England. This order was however ſuppreſſed by pope Innocent VIII. who gave its revenues and effects to that of our Lady of Bethlehem; which alſo becoming extinct, they were beſtowed on the knights of St. John of Jeruſalem. But the ſuppreſſion did not take effect in Poland, where they ſtill ſubſiſt, as alſo in ſeveral provinces of Germany. Theſe canons follow the rule of St. Auguſtine.

Knights of the holy SEPULCHRE, a military order, eſtabliſhed in Paleſtine about the year 1114.

The knights of this order in Flanders, choſe Philip II. king of Spain, for their maſter, in 1558. and afterwards his ſon; but the grand maſter of the order of Malta prevailed on the laſt to reſign: and when afterwards the duke of Nevers aſſumed the ſame quality in France, the ſame grand maſter, by his intereſt and credit, procured a like renunciation of him, and a confirmation of the union of this order to that of Malta.

SEQUEL, in logic, the ſame with concluſion. See the article CONCLUSION.

SEQUENCE, in gaming, a ſet of cards immediately following each other, in the ſame ſuit, as a king, queen, knave, &c. and thus we ſay, a ſequence of three, four, or five cards: but at piquet theſe are called tierces, quarts, quints, &c.

SEQUESTRATION, in common-law, is ſetting aſide the thing in controverſy from the poſſeſſion of both the parties that contend for it. In which ſenſe it is either voluntary, as when done by the conſent of the parties; or neceſſary, as where it is done by the judge, of his own authority, whether the parties will or not.

A ſequeſtration is alſo a kind of extent on an execution for debt, in the caſe of a beneficed clergyman, of the profits of his living, directed to the church-wardens, to receive the ſame, to ſatisfy the judgment.

Sequeſtration is granted on a perſon's ſtanding out and all the proceſſes of contempt for non-appearance in the court of chancery, or exchequer, upon a bill exhibited; and alſo where obedience is not yielded to a decree, in which caſe the court grants a ſequeſtration of the parties lands.

A ſequeſtration is alſo made in London, upon an action of debt; the courſe of proceeding in which caſe is this: the action being entered, the officer goes to the defendant's ſhop or warehouſe, when no perſon is there, and takes a padlock, and hangs it on the door, uttering theſe words: "I do ſequeſter this warehouſe, and the goods and merchandize therein, of the defendant in this action, to the uſe of the plaintiff," *&c.* after which he ſets on his ſeal, and makes a return of the ſequeſtration in the compter; and four days being paſſed after the return made, the plaintiff may, at the next court, have judgment to open the ſhop or warehouſe, and to have the goods appraiſed by two freemen, who are to be ſworn at the next court held for that compter; and then the ſerjeant puts his hand to the bill of appraiſement, and the court grants judgment thereon: but yet the defendant may put in bail before ſatisfaction, and by that means diſſolve the ſequeſtration; and after ſatisfaction, may put in bail to diſprove the debt, *&c.*

In the time of the civil wars, ſequeſtration was uſed for a ſeizing of the eſtates of delinquents, for the uſe of the commonwealth.

SEQUESTRATION, in the civil law, is alſo uſed in various ſenſes: it is taken for the act of the ordinary in diſpoſing of the goods of a deceaſed perſon, which no body will meddle with. A widow is ſaid to ſequeſter, when ſhe diſclaims having any thing to do with the eſtate of her deceaſed huſband. Sequeſtration is alſo uſed to ſignify the gathering up the fruits of a vacant benefice, for the uſe of the next incumbent of the church.

SEQUIN, a gold-coin, ſtruck at Venice, and in ſeveral parts of the grand ſeignor's dominions. See the article COIN.

SERAGLIO, a perſian word, which ſignifies the palace of a prince or lord, in which ſenſe the houſes of the embaſſadors of England, France, *&c.* are, at Conſtantinople, called their ſeraglios. But the term ſeraglio is uſed, by way of eminence, for the palace of the grand ſeignor at Conſtantinople, where he keeps his court, in which his concubines are lodged, and where the youth are trained up for the principal poſts of the empire. It is in form of a triangle, about two miles round, at the end of the promontory Chryſoceras, now called the Seraglio-point: the buildings extend to the top of the hill, and from thence there are gardens, that reach to the ſea. The outward appearance is not very beautiful, the architecture being irregular, conſiſting of ſeparate edifices, in the manner of pavilions and domes. The old ſeraglio is the palace where the grand ſeignor's old miſtreſſes are kept.

The ladies of the haram, which is the part allotted to the women, is a collection of young beautiful girls, who, on their admiſſion, are committed to the charge of ſome old lady, and taught muſic, dancing, and other accompliſhments. Theſe frequently play and dance before the grand ſeignor, while others entertain him with their converſation. Beſides theſe ladies, there are a great many black eunuchs, and female ſlaves, in the ſeraglio, whoſe buſineſs it is to guard and wait upon them.

SERAPH, or SERAPHIM, a ſpirit of the higheſt rank in the hierarchy of angels; who are thus called from their being ſuppoſed to be moſt inflamed with divine love, by their nearer and more immediate attendance at the throne of God, and to communicate their fervor to the remoter and inferior orders. See ANGEL.

SERAPHIC, burning or inflamed with love or zeal, like a ſeraphim: thus St. Bonaventure is called the ſeraphic doctor, from his abundant zeal and fervor.

St. Francis, founder of the cordeliers and franciſcans, is called the ſeraphic father, in memory of a pretended viſion on mount Alverna, in which, it is ſaid, he ſaw a ſeraph glide rapidly from heaven, who impreſſed on him certain marks, repreſenting the wounds which the nails and ſpear made in our Saviour's body, at his crucifixion.

SERAPIAS, BASTARD-HELLEBORE, in botany, a genus of the *gynandria-diandria* claſs of plants, the flower of which conſiſts of five ovato-oblong petals; and its

its fruit is an oval unilocular capſule, obtuſely trigonal, containing a great many ſcobiform ſeeds.

This genus comprehends the helleborine of Tournefort.

SERAVALLE, a town of Italy, in the dutchy of Milan, twenty-four miles north of the city of Genoa.

SERCELLI, a port-town of Algiers, on the coaſt of Barbary: eaſt long. 4°, and north lat. 37°

SEREGIPPE, a city and port-town of Brazil, in the bay of All Saints: weſt lon. 39°, and ſouth lat. 11°.

SERENA, the ſame with coquimbo. See the article COQUIMBO.

Gutta SERENA, in medicine. See the article GUTTA SERENA.

SERENADE, a kind of concert given in the night, by a lover to his miſtreſs, under her window. Theſe ſometimes only conſiſt of inſtrumental muſic, but at other times voices are added: the muſic and ſongs compoſed for theſe occaſions are alſo called ſerenades.

SERENE, a title of honour given to ſeveral princes, and to the principal magiſtrates of republic. The king of England, the republic and the doge of Venice, and the children of the king of Spain are called moſt ſerene: and when the pope, or the ſacred college, write to the emperor, to kings, or the doge, they give them no other title: in like manner the emperor gives no other title to any king, except to the king of France.

Biſhops were antiently addreſſed under the title of ſerene: and the kings of France, of the firſt and ſecond race, when ſpeaking of themſelves, uſed no other title but nôtre ſerenité. The king of Poland and other kings give the title of ſerene to the electors; but the emperor, on writing to the electors or other princes of the empire, only uſes the term dilection; yet in treating with them, he uſes electoral ſerenity to the electors, and ducal ſerenity to the other princes. The Venetians ſet the title of ſerenity above that of highneſs.

SERGE, in commerce, a woollen ſtuff manufactured in a loom, of which there are various kinds, denominated either from their different qualities, or from the places where they are wrought; the moſt conſiderable of which is the london-ſerge, which is highly valued abroad, and of which a manufacture has been for ſome years carried on in France.

In the manufacture of london-ſerges, the longeſt wool is choſen for the warp, and the ſhorteſt for the woof. But before either kind is uſed, it is firſt ſcoured, by putting it in a copper of liquor, ſomewhat more than lukewarm, compoſed of three parts of fair water and one of urine. After it has ſtaid in it long enough for the liquor to take off the greaſe, *&c.* it is ſtirred briſkly about with a wooden peel, taken out, drained, waſhed in a running water, and dried in the ſhade; beaten with ſticks on a wooden rack, to drive out the coarſer duſt and filth; and then picked clean with the hands. It is then greaſed with oil of olives, and the longeſt wool combed with large combs, heated in a little furnace for that purpoſe: to clear it from the oil, it is put into a veſſel of hot ſoap-water, whence being taken out, wrung, and dried, it is ſpun on the wheel. As to the ſhorter wool, intended for the woof, it is only carded on the knee, with ſmall fine cords, and then ſpun on the wheel, without being ſcoured of its oil: and here it is to be obſerved, that the thread for the warp is always to be ſpun finer, and much better twiſted, than that of the woof.

The wool both for the warp and woof being ſpun, and the thread reeled into ſkains; that of the woof is put on ſpools, fit for the cavity of the ſhuttle; and that for the warp is wound on a kind of wooden bobbins, to fit it for warping; and when warped, it is ſtiffened with a ſize, uſually made of the ſhreds of parchment; and, when dried, put into the loom, and mounted ſo as to be raiſed by four treddles, placed under the loom, which the workman makes to act tranſverſely, equally, and alternately, one after another, with his feet; and as the threads are raiſed, throws the ſhuttle. See the article WEAVING.

The ſerge, on being taken from the loom, is carried to the fuller, who fulls or ſcours it, in the trough of his mill, with fullers-earth: and after the firſt fulling, the knots, ends, ſtraws, *&c.* ſticking out on either ſide of the ſurface, are taken off with a kind of plyers or iron-pincers, after which it is returned into the fulling-trough, where it is worked with warm water, in which ſoap has been diſſolved; when quite cleared, it is taken out, the knots are again pulled off; it is then put on the tenter to dry, taking care, as faſt as it dries, to ſtretch it

out both in length and breadth, till it be brought to its juſt dimenſions; then being taken off the tenter, it is dyed, ſhorn, and preſſed.

SERGEANT, or SERJEANT *at law*, or *of the coif*, is the higheſt degree taken at the common law, as that of doctor is of the civil law; and as theſe are ſuppoſed to be moſt learned and experienced in the practice of the courts, there is one court appointed for them to plead in by themſelves, which is the common-pleas, where the common law of England is moſt ſtrictly obſerved: but they are not reſtrained from pleading in any other court, where the judges, who cannot have that honour till they have taken the degree of ſergeant at law, call them brothers.

Theſe ſergeants are created by the king's writ, commanding them to take upon them that degree therein aſſigned, under a great penalty: and one or more of theſe is ſtiled the king's ſergeant, who is choſen out of the reſt to plead for him in all cauſes, more eſpecially thoſe of treaſon, *&c.*

SERGEANT *at arms*, or *mace*, an officer appointed to attend the perſon of the king, to arreſt traitors, and ſuch perſons of quality as offend; and to attend the lord high ſteward when ſitting in judgment on a traitor.

The number of theſe officers is by ſtatute limited to that of thirty: there are now eight at court, who are created with great ceremony; for the perſon kneeling before the king, his majeſty lays the mace on his right ſhoulder, and ſays, "riſe up, ſergeant of arms, and eſquire, for ever." They attend in the preſence-chamber where the band of gentlemen-penſioners wait; and receiving the king at the door, they carry the maces before him, when he goes to chapel, or the houſe of lords.

There are four other ſergeants at arms created in the ſame manner; one of whom attends the lord chancellor; a ſecond, the lord treaſurer; a third, the ſpeaker of the houſe of commons; and a fourth, the lord-mayor of London, on ſolemn occaſions. There is alſo an inferior kind of ſergeants at mace, who attend the mayor, or other head officer of corporations.

SERGEANT, or SERJEANT, in war, is an inferior officer in a company of foot, or troop of dragoons, armed with an halbard, and appointed to ſee diſcipline obſerved, to teach the ſoldiers the exerciſe of their arms, and to order, ſtraiten, and form ranks, files, *&c.*

SERGEANTY, or SERJEANTY, in law, is taken for a ſervice that cannot be due from a tenant to any other lord beſides the king.

This is divided into grand and petit ſergeanty. Grand ſergeanty is where a perſon holds lands of the king, by ſuch ſervice as he ought to perform in perſon, as to aſſiſt at his coronation, bear his banner or ſpear, *&c.* Petit ſergeanty is when a man holds lands of the king, on account of his paying him annually ſome ſmall thing towards his wars, as a ſword, dagger, *&c.*

The honorary ſervices of grand ſergeanty ſtill continue, notwithſtanding the ſtatute 12 Car. II. c. 24.

SERIANIA, in botany, the name by which Plumier calls the paullinia of Linnæus. See PAULLINIA.

SERICUM, SILK, in natural hiſtory. See the article SILK.

Sericum is alſo a name given to the flowers of Zink, on account of their fibrous texture. See ZINK.

SERIES, in general, denotes a continued ſucceſſion of things in the ſame order, and having the ſame relation or connection with each other: in this ſenſe we ſay, a ſeries of emperors, kings, biſhops, *&c.*

In natural hiſtory, a ſeries is uſed for an order or ſubdiviſion of ſome claſs of natural bodies; comprehending all ſuch as are diſtinguiſhed from the other bodies of that claſs, by certain characters, which they poſſeſs in common, and which the reſt of the bodies of that claſs have not. See CLASS, ORDER, GENUS, *&c.*

SERIES, in mathematics, is a number of terms, whether of numbers or quantities, increaſing or decreaſing in a given proportion; the doctrine of which has already been given under the article PROGRESSION.

Infinite SERIES, is a ſeries conſiſting of an infinite number of terms, that is, to the end of which it is impoſſible ever to come; ſo that let the ſeries be carried on to any aſſignable length, or number of terms, it can be carried yet farther, without end or limitation.

A number actually infinite (that is, all whoſe units can be actually aſſigned, and yet is without limits) is a plain contradiction to all our ideas about numbers; for whatever number we can conceive, or have any proper idea of, is always deter-

determinate and finite; ſo that a greater after it may be aſſigned, and a greater after this; and ſo on, without a poſſibility of ever coming to an end of the addition or encreaſe of numbers aſſignable; which inexhauſtibility, or endleſs progreſſion in the nature of numbers, is all we can diſtinctly underſtand by the infinity of number; and therefore to ſay that the number of any things is infinite, is not ſaying, that we comprehend their number, but indeed the contrary; the only thing poſitive in this propoſition being this; that the number of theſe things is greater than any number which we can actually conceive and aſſign. But then, whether in things that do really exiſt, it can be truely ſaid, that their number is greater than any aſſignable number; or, which is the ſame thing, that in the numeration of their units one after another, it is impoſſible ever to come to an end; this is a queſtion about which there are different opinions, with which we have no buſineſs in this place; for all that we are concerned here to know, is this certain truth, that after one determinate number, we can conceive a greater, and after this a greater, and ſo on without end. And therefore, whether the number of any things that do or can really exiſt all at once, can be ſuch that it exceeds any determinable number, or not, this is true, that of things which exiſt, or are produced ſucceſſively one after another, the number may be greater than any aſſignable one; becauſe though the number of things thus produced, that does actually exiſt at any time, is finite, yet it may be increaſed without end. And this is the diſtinct and true notion of the infinity of a ſeries; that is, of the infinity of the number of its terms, as it is expreſſed in the definition.

Hence it is plain, that we cannot apply to an infinite ſeries the common notion of a ſum, *viz.* a collection of ſeveral particular numbers that are joined and added together one after another, for this ſuppoſes that theſe particulars are all known and determined; whereas the terms of an infinite ſeries cannot be all ſeparately aſſigned, there being no end in the numeration of its parts, and therefore it can have no ſum in ſenſe. But again, if we conſider that the idea of an infinite ſeries conſiſts of two parts, *viz.* the idea of ſomething poſitive and determined, in ſo far as we conceive the ſeries to be actually carried on; and the idea of an inexhauſtible remainder ſtill behind, or an endleſs addition of terms that can be made to it one after another; which is as different from the idea of a finite ſeries as two things can be: hence we may conceive it as a whole of its own kind, which therefore may be ſaid to have a total value whether that be determinable or not. Now in ſome infinite ſeries this value is finite or limited; that is, a number is aſſignable beyond which the ſum of no aſſignable number of terms of the ſeries can ever reach, nor indeed ever be equal to it, yet it may approach to it in ſuch a manner, as to want leſs than any aſſignable difference; and this we may call the value or ſum of the ſeries; not as being a number found by the common method of addition, but as being ſuch a limitation of the value of the ſeries, taken in all its infinite capacity, that if it were poſſible to add them all one after another, the ſum would be equal to this number.

Again, in other ſeries the value has no limitation; and we may expreſs this, by ſaying, the ſum of the ſeries is infinitely great; which indeed ſignifies no more than that it has no determinate and aſſignable value; and, that the ſeries may be carried ſuch a length as its ſum, ſo far, ſhall be greater than any given number. In ſhort, in the firſt caſe we affirm there is a ſum, yet not a ſum taken in the common ſenſe; in the other caſe we plainly deny a determinate ſum in any ſenſe.

Theorem I. In an infinite ſeries of numbers, increaſing by an equal difference or ratio (that is, an arithmetical or geometrical encreaſing progreſſion) from a given number, a term may be found greater than any aſſignable number.

Hence, if the ſeries encreaſe by differences that continually encreaſe, or by ratios that continually encreaſe, comparing each term to the preceding, it is manifeſt that the ſame thing muſt be true, as if the differences or ratios continued equal.

Theorem II. In a ſeries decreaſing in infinitum in a given ratio, we can find a term leſs than any aſſignable fraction.

Hence, if the terms decreaſe, ſo as the ratios of each term to the preceding do alſo continually decreaſe, then the ſame thing is alſo true, as when they continue equal.

Theor.

Theor. III. The ſum of an infinite ſeries of numbers all equal, or encreaſing continually, by whatever differences or ratios, is infinitely great; that is, ſuch a ſeries has no determinate ſum, but grows ſo as to exceed any aſſignable number.

Demonſ. 1. If the terms are all equal, as A : A : A, &c. then the ſum of any finite number of them is the product of A by that number, as A n; but the greater n is, the greater is A n; and we can take n greater than any aſſignable number, therefore A n will be ſtill greater than any aſſignable number.

Secondly, ſuppoſe the ſeries encreaſes continually, (whether it do ſo infinitely or limitedly) then its ſum muſt be infinitely great, becauſe it would be ſo if the terms continued all equal, and therefore will be more ſo, ſince they encreaſe. But if we ſuppoſe the ſeries encreaſes infinitely, either by equal ratios or differences, or by increaſing differences or ratios of each term to the preceding; then the reaſon of the ſums being infinite will appear from the firſt theorem; for in ſuch a ſeries, a term can be found greater than any aſſignable number, and much more therefore the ſum of that and all the preceding.

Theor. IV. The ſum of an infinite ſeries of numbers decreaſing in the ſame ratio is a finite number; equal to the quote ariſing from the diviſion of the product of the ratio and firſt term, by the ratio leſs by unity; that is, the ſum of no aſſignable number of terms of the ſeries can ever be equal to that quote; and yet no number leſs than it, is equal to the value of the ſeries, or to what we can actually determine in it; ſo that we can carry the ſeries ſo far, that the ſum ſhall want of this quote leſs than any aſſignable difference.

Demonſ. To whatever aſſigned number of terms the ſeries is carried, it is ſo far finite; and if the greateſt term is l, the leaſt A, and the ratio r, than the ſum is $S = \frac{rl - A}{r - 1}$. See *Geo.* PROGRESSION.

Now, in a decreaſing ſeries from l, the more terms we actually raiſe, the laſt of them, A becomes the leſſer, and the leſſer A be, $rl - A$ is the greater, and ſo alſo is $\frac{rl - A}{r - 1}$: but $rl - A$ being ſtill leſs than rl, therefore $\frac{rl - A}{r - 1}$ is ſtill leſs than $\frac{rl}{r - 1}$, that is, the ſum of any aſſignable number of terms of the ſeries is ſtill leſs than the quote mentioned, which is $\frac{rl}{r - 1}$, and this is the firſt part of the theorem.

Again: The ſeries may be actually continued ſo far, that $\frac{rl - A}{r - 1}$ ſhall want of $\frac{rl}{r - 1}$ leſs than any aſſignable difference; for, as the ſeries goes on, A becomes leſs and leſs in a certain ratio, and ſo the ſeries may be actually continued till A becomes leſs than any aſſignable number, (by Theorem. II.) now $\frac{rl}{r-1} - \frac{rl - A}{r-1} = \frac{A}{r-1}$, and $\frac{A}{r-1}$ is leſs than A; therefore let any number aſſigned be called N, we can carry the ſeries ſo far till the laſt term A be leſs than N; and becauſe $\frac{rl - A}{r - 1}$ wants of $\frac{rl}{r-1}$, the difference $\frac{A}{r-1}$, which is leſs than A, which is alſo leſs than N, therefore the ſecond part of the theorem is alſo true, and $\frac{rl}{r-1}$ is the true value of the ſeries.

Scholium. The ſenſe in which $\frac{rl}{r-1}$ is called the ſum of the ſeries, has been ſufficiently explained; to which, however, we ſhall add this; that whatever conſequences follow from the ſuppoſition of $\frac{rl}{r-1}$ being the true and adequate value of the ſeries taken in all its infinite capacity, as if the whole were actually determined and added together, can never be the occaſion of any aſſignable error in any operation or demonſtration where it is uſed in that ſenſe; becauſe if it is ſaid that it exceeds that adequate value, yet it is demonſtrated that this exceſs muſt be leſs than any aſſignable difference, which is in effect no difference, and ſo the conſequent error will be in effect no error: for if any error can happen from $\frac{rl}{r-1}$ being greater than it ought to be, to repreſent the complete value of the infinite ſeries, that error depends upon the exceſs of $\frac{rl}{r-1}$ over that complete value; but this exceſs being unaſſignable, that conſequent error muſt be ſo too; becauſe ſtill the leſs the exceſs is,

is, the leſs will the error be that depends upon it. And for this reaſon we may juſtly enough look upon $\frac{rl}{r-1}$ as expreſſing the adequate value of the infinite ſeries. But we are farther ſatisfied of the reaſonableneſs of this, by finding in fact, that a finite quantity does actually convert into an infinite ſeries, which happens in the caſe of infinite decimals. For example, $\frac{2}{3} = .6666$, &c. which is plainly a geometrical ſeries from $\frac{6}{10}$ in the continual ratio of 10 to 1; for it is $\frac{6}{10}+\frac{6}{100}+\frac{6}{1000}+\frac{6}{10000}$, &c.

And reverſely; if we take this ſeries, and find its ſum by the preceding theorem, it comes to the ſame $\frac{2}{3}$; for $l = \frac{6}{10}$, $r = 10$, therefore $rl = \frac{60}{10} = 6$; and $r-1 = 9$; whence $\frac{rl}{r-1} = \frac{6}{9} = \frac{2}{3}$.

We have added here a table of all the varieties of determined problems of infinite, decreaſing, geometrical progreſſions, which all depend upon theſe three things, *viz.* the greateſt term l, the ratio r, and the ſum S; by any two of which the remaining one may be found: to which we have added ſome other problems, wherein S—L is conſidered as a thing diſtinct by itſelf, that is, without conſidering S and L ſeparately.

Given	Sought		Or ſuppoſing the ratio $\frac{a}{b}$ or the ſecond term to be M, whereby the ratio is $\frac{l}{M}$, then is	Solutions
$r\ l$	s,	$s = \frac{rl}{r-1}$		$s = \frac{a}{a-b}$ of $l = \frac{l^2}{l-M}$
$r\ s$	l,	$l = \frac{s \times \overline{r-1}}{r}$		$l = \frac{a-b}{a}$ of $s = \frac{\overline{l-M} \times s}{l}$
$l\ s$	r,	$r = \frac{s}{s-l}$		$s-l = \frac{b}{a-b}$ of $l = \frac{M\,l}{l-M}$
$l\ r$	$s-l$,	$s-l = \frac{l}{r-1}$		$s-l = \frac{b}{a}$ of $s = \frac{M\,s}{l}$
$s\ r$	$s-l$,	$s-l = \frac{s}{r}$		$s = \frac{a}{b}$ of $s-l = \frac{l \times \overline{s-l}}{M}$
$r.s-l$	s, l	$s = \overline{s-l} \times r$; $l = \overline{s-l} \times \overline{r-1}$		$l = \frac{a-b}{b}$ of $s-l = \frac{\overline{l-M} \times \overline{s-l}}{M}$

Theorem V. In the arithmetic progreſſion 1, 2, 3, 4, &c. the ſum is to the product of the laſt term, by the number of terms, that is, to the ſquare of the laſt term; in a ratio always greater than 1:2, but approaching infinitely near it. But if the arithmetical ſeries begins with 0, thus, 0, 1, 2, 3, 4, &c. then the ſum is to the product of the laſt term, by the number of terms, exactly in every ſtep as 1 to 2.

Theorem VI. Take the natural progreſſion beginning with 0, thus, 0, 1, 2, 3, &c. and take the ſquares of any the like powers of the former ſeries; as the ſquares, 0, 1, 4, 9, &c. or cubes, 0, 1, 8, 27; and then again take the ſum of the ſeries of powers to any number of terms, and alſo multiply the laſt of the terms ſummed by the number of terms, (reckoning always 0 for the firſt term;) the ratio of that ſum, to that product is more than $\frac{1}{n \times 1}$ (n being the index of the powers) that is, in the ſeries of ſquares it is more than $\frac{1}{3}$; in the cubes more than $\frac{1}{4}$; and ſo on: But the ſeries going on in infinitum, we may take in more and more terms without end into the ſum; and the more we take, the ratio of the ſum to the product mentioned grows leſs and leſs; yet ſo as it never can actually be equal to $\frac{1}{n \times 1}$ but approaches infinitely near to it, or within leſs than any aſſignable difference.

SEROSITY, in medicine, denotes an over-abundance of ſerum. See SERUM and BLOOD.

SERPA,

SERPA, a town of Portugal, in the province of Alentejo, ſituated on the eaſt-ſide of the river Guadiana, in weſt long. 8° 20′, north lat. 37° 45′.

SERPENS, in aſtronomy, a conſtellation of the northern hemiſphere; conſiſting of ſeventeen ſtars, according to Ptolemy; of nineteen, according to Tycho; and of fifty-nine, in the britannic Catalogue.

SERPENT, *ſerpens*, in zoology, a general term for all amphibious animals without legs. See the article AMPHIBIOUS.

Mr. Ray defines ſerpents to be creatures breathing by means of lungs, having only one ventricle in the heart, having no feet, and having a long body, covered with ſcales. To which he adds, that in cold ſeaſons they can bear hunger a long time. The greater part of the ſerpent claſs are poiſonous, and dangerous in their bite, leaving a miſchievous liquor in the wound made by their tooth, which mixing by this means immediately with the blood, is of fatal conſequence; though the whole creature may be eaten with ſafety, or even the poiſonous liquor, which does this miſchief in the wound, taſted without hurt.

Notwithſtanding that ſerpents reſpire by means of lungs, they do not take in and diſcharge their breath by ſuch ſhort intervals as other animals, but what they have once inſpired will ſerve them a long time; for as they are of a cold nature, and their naturally neceſſary vital warmth very ſmall, they do not require ſuch an eternally renewed ſupply of that pabulum of vital heat, as thoſe which have more of it; and as with us they lie half the year torpid, and half dead, their vital warmth at that time, like fire ſmothered under aſhes, barely exiſts, and needs perhaps no more air than what the creature took in at one inſpiration, before its laying itſelf down for the ſeaſon, which ſerves it till the life-renewing ſpring returns.

Serpents, according to Mr. Ray, may be divided into the poiſonous and the harmleſs; the firſt having long dentes exerti, with poiſonous liquors contained at their bottom, which on biting they diſcharge into the wound; the others wanting theſe teeth, and this poiſon.

They may alſo be divided, in regard to their generation, into the oviparous and viviparous; but this is a leſs firmly founded diſtinction than may be ſuppoſed, ſince all ſerpents are truly and properly produced of eggs; and the only difference is, that ſome depoſit their eggs in dung-hills, and the like places, to be hatched by accidental heat; while others retain thoſe eggs to be hatched in their own bodies, and ſo bring forth living young ones. Of the firſt kind is the common ſnake, of the latter the viper.

This ſeries of animals comprehends ſeveral diſtinct genera; as the amphiſbæna, anguis, coluber, cenchris, and crotalophorus. See the articles AMPHISBÆNA, ANGUIS, *&c.*

Sea-SERPENT, *ſerpens marinus*, in ichthyology, a name given to ſeveral ſpecies of muræna. See the article MURÆNA.

SERPENT'S-TONGUES, a name by which ſome call the gloſſopetræ. See the article GLOSSOPETRA.

SERPENTARIA, SNAKE-ROOT, in botania and pharmacy, the name of a ſpecies of ariſtolochia, or birthwort, with auriculated leaves. See BIRTHWORT.

The virginian ſnake-root obtained its name, as being accounted a ſpecific againſt venomous bites: but whatever truth there may be in that, it is undoubtedly an excellent diuretic, diaphoretic, and alexipharmic medicine, and, conſequently, good in inflammatory and malignant fevers: it is alſo a powerful antiſeptic, and its doſe is from four to ten or fifteen grains, in powder.

SERPENTARIUS, in aſtronomy, a conſtellation of the northern hemiſphere; conſiſting, according to different authors, of 25, 29, or even 69 ſtars.

SERPENTINE, in general, denotes any thing that reſembles a ſerpent: hence, the worm or pipe of a ſtill, twiſted in a ſpiral manner, is termed a ſerpentine worm.

SERPENTINE COLUMN. See COLUMN.

SERPENTINE MARBLE, *ophites*, a ſpecies of marble, ſo called from its being variegated with ſtreaks and ſpots like the ſkin of a ſerpent. See MARBLE.

SERPENTINE VERSES, ſuch as begin and end with the ſame words.

SERPIGO, in medicine, a ſpecies of herpes. See the article HERPES.

SERPYLLUM, MOTHER OF THYME, in botany, a ſpecies of thyme. See THYME.

SERRATED, in general, ſomething indented, or notched, in the manner of a ſaw; a term much uſed in the deſcription of the leaves of plants, which are ſaid to be duplicately ſerrated, when the edges of the large ſerratures are again ſerrated with leſſer indentings of the ſame kind.

SERRATULA, SAW-WORT, in botany, a genus of the *ſyngeneſia-polygamia-æqualis* claſs of plants, the compound flower of which is tubuloſe and uniform; and the partial ones are monopetalous, infundibuliform, and quinquifid at the limb: the ſtamina are five very ſhort capillary filaments: the ſeeds are ſolitary, crowned with down, and contained in the cup.

SERPA, a town of Portugal, in the province of Alentejo, weſt long. 8° 20′, north lat. 37° 45′.

SERRATUS, in anatomy, a name given to ſeveral muſcles from their reſemblance to a ſaw: as, 1. The ſerratus major anticus, which ariſes by dentated origins from the ſix lower true ribs, and from one, or ſometimes two, of the upper ſpurious ones. 2. The ſerratus minor anticus, called alſo the pectoralis minor, which ariſes from the ſecond, third, and fourth true ribs, continues its courſe under the pectoralis magnus, and is inſerted into the caracoide proceſs of the ſcapula: theſe two ſerve to move the ſcapula forward and downward, and many anatomical writers have referred them to the number of the elevators of the ribs. 3. The ſerratus poſticus ſuperior, which ariſes with a thin and broad tendon, from the two lower vertebræ of the neck, and the two upper ones of the back; and terminates in the ſecond, third, and fourth ribs. 4. The ſerratus poſticus inferior, which riſes with a broad tendon from the three lower vertebræ of the back, and the two upper ones of the loins; it terminates in the four inferior ſpurious ribs, and ſurrounds the extenſors of the back, in the manner of a vagina, to prevent their fibres from ſeparating one from another, as they might otherwiſe do in violent motions theſe two laſt contribute to reſpiration.

SERTULARIA, in botany, a genus of the *cryptogamia-lithophytorum* of Linnæus, and the ſame with the corallina of Tourneſort. See CORALLINA.

SERVANT, a term of relation ſignifying a perſon who owes and pays a limited obedience for a certain time, to another in quality of maſter.

If any ſervant, who is hired for a year, depart before the end of his term, without reaſonable cauſe, to be allowed by a juſtice of the peace; or after the term is expired, without giving a quarter's warning, he is liable to be committed to priſon by two juſtices, till he gives ſecurity to ſerve out the time; or he may by one juſtice be ſent to the houſe of correction, there to be puniſhed as a diſorderly perſon, 7 Jac. I. c. 4. On the other hand, a maſter cannot put away his ſervant before the end of the term he was hired for, without ſome reaſonable cauſe allowed by a juſtice of the peace; nor after the expiration of the term, without a quarter's warning given, on pain of forfeiting 40 s. Where a ſervant that is hired for a year happens to fall ſick, ſuch ſervant ought not to be diſcharged, nor his wages abated on that account.

It is held, that if one being a creditor ſends his ſervant for money, to whom it is paid, this will be a good payment and diſcharge, though the ſervant does not bring the money to his maſter. It has been adjudged, that where a ſervant uſually buys goods for his maſter upon credit, and takes up things in his name, though it be for his own uſe, the maſter is liable: nevertheleſs it is not ſo where the maſter uſually gives him ready money. Where the maſter gives his ſervant money to buy goods for him, and he converts the money to his own particular uſe, and at the ſame time buys them upon credit, the maſter is anſwerable where ſuch goods come into his own poſſeſſion.

SERVETISTS, a name given to the modern antitrinitarians, from their being ſuppoſed to be the followers of Michael Servetus, who in the year 1559, was burnt at Geneva, together with his books.

SERVIA, a province of european Turky, bounded by the Save and the Danube, on the north; by Bulgaria, on the eaſt; by Albania and Macedon, on the ſouth; and by Boſnia and Dalmatia, on the weſt.

SERVICE, in law, is a duty which a tenant, on account of his fee, owes to his lord.

There are many diviſions of ſervices, as, 1. Into perſonal, where ſomething is to be done by the tenant in perſon, as homage and fealty. 2. Real, ſuch as wards, marriages, &c. 3. Accidental, including heriots, reliefs, and the like. 4. Intire, where, on the alienation of any part of the lands by a tenant, the ſervices become multiplied. 5. Frankſervice, which was performed by freemen, who were not obliged to perform any baſe ſervice, but only to find a man and horſe to attend the lord into the army, or to court. 6. Knight's ſervice,

by which lands were antiently held of the king, on paying homage, ſervice in war, &c. 7. The rights and prerogatives, which within certain manors belong to the lords thereof by the king's grants, ſuch as the power of judicature in matters of property, and in felonies and murders; minting of money, aſſize of bread, beer, weights and meaſures, aſſeſſments, &c.

SERVITES, a religious order in the church of Rome, founded about the year 1233, by ſeven florentine merchants, who with the approbation of the biſhop of Florence renounced the world, and lived together in a religious community on mount Senar, two leagues from that city. It is pretended, that when they firſt appeared in the black habit given them by the biſhop, the very children at the breaſt cried out, *ſee the ſervants of the Virgin*, and that this miracle determined them to take no other name but ſervites, or ſervants of the Virgin. This order became very numerous.

There are alſo nuns of this order, who have ſeveral monaſteries in Germany, Italy, and Flanders.

SERVITOR, in the univerſity of Oxford, a ſtudent who attends on another for his maintenance and learning.

SERVITORS *of bills*, ſervants or meſſengers of the marſhal of the king's bench, ſent with bills or writs, to ſummon people to that court: theſe are now called tipſtaves.

SERVITUDE, the condition of a ſervant, or rather ſlave. See the articles SERVANT and SLAVE.

SERUM, a thin, tranſparent, ſaltiſh liquor, which makes a conſiderable part in the maſs of blood. See *Analyſis of the* BLOOD. The ſerum is in reality the ſame with the lympha, which is carried by the arteries through the ſeveral parts of the body; whence it returns partly in the veins, and partly in the lymphatic veſſels. See the article LYMPHA.

Sweat and urine are nothing but ſerum drained of their nutritious parts, by repeated circulations, and ſecreted from the blood in the glands of the ſkin and kidneys.

SESAMOIDA OSSA, in anatomy, ſeveral ſmall bones that ſomewhat reſemble the ſeed of the ſeſamum, whence their name. Their moſt uſual ſituation is, 1. In the thumb or great toe; in each of which we often find two of them, though not unfrequently only one. 2. One in the juncture of the metacarpus with the little finger: this is frequently lodged in the muſcle of that finger. 3. One frequently in each external condyle of the os femoris. One under the os cuboides of the tarſus, in the tendon of the peronæus poſtius. Theſe are uſually found in adults, or in elderly people. Sometimes, though more rarely, there is alſo one in the internal condyle of the os femoris; and ſometimes there is one in the external ſurface of the os metacarpi, which ſuſtains the fore-finger, lodged in the tendon of the adductor muſcle of the index. Upon the whole, ſays Heiſter, there are very rarely found more than ſixteen of them; thoſe anatomiſts, therefore, err greatly, who place two at the articulation of each finger and toe.

The ſize and ſhape of theſe bones are various and irregular: they are cartilaginous in young ſubjects, but grow hard and bony by age. They ſerve as a kind of trochleæ to the muſcles, and increaſe their power.

SESAMUM, the OILY GRAIN PLANT, in botany, a genus of the *didynamia-angioſpermia* claſs of plants, the corolla whereof conſiſts of a ringent petal; the tube is roundiſh, and almoſt the length of the cup; the faux is inflated, patent, and very large; the limb is quinquifid; the fruit conſiſts of an oblong quadragonal capſule, compreſſed, acuminated, and quadrilocular: the ſeeds are numerous and roundiſh.

The ſeeds of this plant, upon expreſſion, yield a larger quantity of oil than almoſt any other known vegetable; among the Indians they are uſed as food.

SESELI, DUTCH SARIFRAGE, in botany, a genus of the *pentandria-digynia* claſs of plants, the general corolla of which is uniform; the ſingle flowers are compoſed each of five inflexo-cordate and ſlightly unequal petals; the fruit is naked, oval, ſmall, ſtriated, and ſeparable into two parts; the ſeeds are two, oval, convex, and ſtriated on one ſide, and plane on the other.

SESQUI, a latin particle, ſignifying a whole and a half, which joined with *altera*, *terza*, *quarta*, &c. is much uſed in the italian muſic to expreſs a kind of ratios, particularly ſeveral ſpecies of triples. See the article TRIPLE.

The ratio expreſſed by ſeſqui is the ſecond ratio of inequality, called alſo ſuper-particular ratio, and is when the greater term contains the leſs once, and

ſome

ſome certain part over, as 3 : 2, where the firſt term contains the ſecond once, and unity over, which is a quota part of 2. Now if the part remaining be juſt half the leſs term, the ratio is called ſeſqui-altera; if it be a third part of the leſs term, as 4 : 3, the ratio is called ſeſqui-terza, or tertia; if a fourth, as 5 : 4, the ratio is ſeſqui-quarta, and thus to infinity, ſtill adding to ſeſqui the ordinal number of the leſs term. In Engliſh we ſometimes ſay, ſeſqui-alteral, ſeſqui-third, fourth, *&c.* As to the kinds of triples expreſſed by the particle ſeſqui, they are theſe, the greater perfect ſeſqui-alteral, *ſeſqui-altera magiore, perfctta*, which is a triple where the breve is three minims, and that without having any point or dot annexed to it. The greater imperfect ſeſqui-alteral, which is where the breve when pointed contains three minims, and that without any point, only two. The leſs perfect ſeſqui-alteral, is where the ſemibreve contains three minims, and that without any point. The leſs imperfect ſeſqui-alteral is a triple where the ſemibreve with a point contains three minims, and two without. According to Buontempi, one may likewiſe call the triples $\frac{6}{4}$ and $\frac{12}{8}$ ſeſqui-alterals. See the article PROPORTION.

Seſqui-octave, is a kind of triple marked $C\frac{9}{8}$, called by the Italians *nonupla di crome*, where there are nine quavers in every bar, whereof eight are required in common time. The double ſeſqui-fourth, or ſeſqui-quarta dupla, marked thus, $C\frac{9}{4}$, called by the Italians *nonupla di ſemiminime*, is where there are nine crotchets in a bar inſtead of four, in common time. Seſqui-terza, the triples $\frac{6}{8}$, and $\frac{12}{16}$, ſays Buontempi, may be thus denominated. Seſqui-ditone is a concord reſulting from the ſound of two ſtrings whoſe vibrations in equal time are to each other as 5 : 6. See the articles DITONE, VIBRATION, CHARACTER, *&c.*

SESQUI-ALTERAL PROPORTION, in geometry and arithmetic, is when any number or quantity contains another once and an half, and the number ſo contained in the greater, is ſaid to be to it in ſubſeſqui-alteral proportion. See the article PROPORTION.

SESQUI-DUPLICATE PROPORTION, is when of two terms the greater contains the leſs twice, with half another over.

SESQUI-QUADRATE, an aſpect or poſition of the planets, when they are at the diſtance of four ſigns and an half, or 135 degrees from each other; and ſeſqui-quintile is an aſpect of the planets when they are 108 degrees from each other.

SESQUI-TERTIONAL PROPORTION, is when any number or quantity contains another once and one third.

SESSA, a town of Italy, in the kingdom of Naples, and territory of Lavoro, ſituated a little weſt of the Tuſcan ſea, twenty-four miles north of Naples.

SESSILE ROOTS, among botaniſts, ſuch tuberous roots as adhere to the baſe of the ſtalk. And a ſeſſile leaf expreſſes a leaf immediately fixed to the ſtalk or root without any petiole.

SESSION, *ſeſſio*, in general, denotes each ſitting or aſſembly of a council, *&c.*

SESSION *of parliament*, is the ſeaſon or ſpace from its meeting to its prorogation. See the article PARLIAMENT.

Kirk-SESSION. See the article KIRK.

SESSION *for weights and meaſures*, is in London taken for a ſitting of four juſtices choſen from among the mayor, recorder, and aldermen, who hold a court in order to inquire into offences of perſons ſelling by falſe weights and meaſures contrary to the ſtatutes, and to puniſh the ſame.

SESSION, in law, denotes a ſitting of juſtices in court upon their commiſſion; as the ſeſſions of oyer and terminer, the quarter ſeſſions, otherwiſe called the general or open ſeſſions of the peace, in oppoſition to what is called a privy ſeſſion, held upon ſpecial occaſions for ſpeedier diſpatch of juſtice. This general ſeſſion of the peace is a court of record held before two or more juſtices, one being of the quorum, for the execution of the authority granted them by their commiſſion and particular ſtatutes, whereby they are authorized to hear and determine treſpaſſes againſt the public peace, *&c.* and likewiſe divers offences by ſtatute. This court of ſeſſions is held four times a year in every county. See the article COURT, *&c.*

SESTERCE, *ſeſtertius*, a ſilver coin in uſe among the Romans. See COIN.

Some authors make two kinds of ſeſterces, the leſs, called ſeſtertius, in the maſculine gender, and the great one, called ſeſtertium, in the neuter, the latter containing a thouſand of the other. See the article MONEY.

Others will have any ſuch diſtinction of great and little ſeſterces unknown to the Romans; ſeſtertius, ſay they, was an

adjective, and ſignified *as ſeſtertius*, or two aſes and an half, and when uſed plurally, as in quinquaginta ſeſtertium, or ſeſtertia, it was only by way of abbreviation, and there was always underſtood millia, or thouſands.

Seſterce, or ſeſtertius, was alſo uſed by the antients for a thing containing two wholes and an half of another, as *as* was taken for any whole or integer. See the article As.

SESTOS, a noted fortreſs of european Turky, ſituated at the entrance of the Helleſpont or Dardanells, twenty-four miles ſouth-weſt of Gallipoli.

SESTUPLO, in muſic. See SEXTUPLE.

SET, or SETS, a term uſed by the farmers and gardiners to expreſs the young plants of the white-thorn and other ſhrubs, with which they uſe to raiſe their quick or quickſet-hedges. See the articles HEDGE and OFFSET.

ET-BOLTS, in a ſhip. See BOLT.

SETHIANS, in church-hiſtory, chriſtian heretics, ſo called becauſe they paid divine worſhip to Seth, whom they looked upon to be Jeſus Chriſt the ſon of God, but who was made by a third divinity, and ſubſtituted in the room of the two families of Abel and Cain, which had been deſtroyed by the deluge. Theſe heretics appeared in Egypt in the ſecond century, and as they were addicted to all ſorts of debauchery, they did not want for followers, and continued in Egypt above two hundred years.

SETIMO, a town of Italy in the province of Piedmont, ſituated on the river Po, eight miles north of Turin.

SETON, in ſurgery, a few horſe-hairs, ſmall threads, or large packthread drawn through the ſkin, chiefly the neck, by means of a large needle or probe, with a view to reſtore or preſerve health.

There are chiefly three methods of performing this operation practiſed among ſurgeons. The firſt is by taking up the ſkin in the lower part of the neck, and introducing a needle armed with ſilk or thread through the ſkin, which is to be left in the neck after the needle is removed; the wound is then dreſſed with ſome digeſtive ointment, and covered with a plaſter perforated on each ſide for the ligature to paſs through; the ligature is to be ſhifted or drawn through the wound a little every day, and the matter is to be wiped off, by which means it will degenerate into an ulcer with a double orifice, making a copious diſcharge daily; and when one ligature is become foul and unfit for uſe, another may be introduced by faſtening it to the end of the old one. The ſecond way of making a ſeton differs little from the former; only inſtead of a large needle, a double-edged ſcalpel is made uſe of, by means of which a larger aperture is made, and a greater quantity of matter is thereby diſcharged. The third manner is by an inſtrument for the purpoſe, whereby the ſkin is pinched up, and afterwards perforated with a ſharp-pointed and red-hot iron, after which the ligature is introduced. We find by experience, that ſetons are very uſeful in the hydrocephalus, catarrhs, inflammations and other diſorders, particularly thoſe of the eyes, as a gutta ſerena, cataract, and incipient ſuffuſion; to thoſe we may add intenſe headachs, with ſtupidity, drowſineſs, epilepſies, and even an apoplexy itſelf.

SETTE, in geography, the ſame with cette. See the article CETTE.

SETTE, a veſſel very common in the Mediterranean, with one deck, and a very long and ſharp prow; they carry ſome two maſts, ſome three, without top-maſts. Their yards and ſails are all like the miſen; the leaſt of them are of ſixty tons burden. they ſerve to tranſport cannon and proviſion for ſhips of war, and the like.

SETTER, among farmers. To ſetter is to cut the dewlap of an ox or cow, and into the wound to put the root of the helleboraſter, whereby an iſſue is made for ill humours to vent themſelves.

SETTING, in aſtronomy, the withdrawing of a ſtar or planet, or its ſinking below the horizon. Aſtronomers and poets make three different kinds of ſetting of the ſtars, *viz.* the coſmical, acronycal, and helical. See the articles COSMICAL, ACRONYCAL, HELICAL, and RISING.

SETTING, in the ſea-language. To ſet the land or the ſun, by the compaſs, is to obſerve how the land bears on any point of the compaſs, or on what point of the compaſs the ſun is. Alſo when two ſhips ſail in ſight of one another, to mark on what point the chaſed bears, is termed ſetting the chaſe by the compaſs.

SETTING, among ſportſmen, a term uſed to expreſs the manner of taking partridges by means of a dog peculiarly trained to that purpoſe.

The ſetting dog generally uſed is a long land-ſpaniel, taught by nature to hunt partridges more than any other game,

and in his untaught ſtate running over the fields in ſearch of them; but being taught, the creature is under ſuch excellent command, that he will, in the midſt of his higheſt career, attend the leaſt hem from his maſter, and ſtand ſtill to look in his face and to take his orders by the ſlighteſt ſignals; and when he is ſo near his game that it is almoſt in his mouth, he will ſtand ſtock-ſtill, or lye down on his belly, till his maſter arrives, and he receives his directions. The ſetting-dog being taken to the haunt of the partridges, is to be caſt off, and ſent to range; but he muſt be made to keep near the ſportſman, and not to run wildly on, but to beat all the ground regularly. If in the dog's ranging he ſtops on a ſudden, the ſportſman is to make up to him, and as there is certainly game before him, he muſt be ordered to advance; if he refuſes this, and looks back and ſhakes his tail, it is a ſignal that they are cloſe before him, and the ſportſman is then to take a circumference, and look carefully before the dog's noſe, to ſee where they are, and how they lie; then going up and ſtaking down one end of the net, he is to command the dog to lie ſtill, and to draw the net gently over the birds, then making in with a noiſe, he is to ſpring them, and they will be entangled and taken, as they riſe.

SETTLE, a market-town in the weſt riding of Yorkſhire, ſituated forty-five miles weſt of York.

SEVENOAK, a market-town of Kent, fourteen miles weſt of Maidſtone.

SEVENTH, *ſeptima*, in muſic, an interval called by the Greeks heptachordon, whereof there are four kinds; firſt, the defective ſeventh, conſiſting of three tones and three greater ſemitones; the ſecond, called by Zarlin and the Italians demiditono con diapente, or ſettimo minore, is compoſed diatonically of ſeven degrees and ſix intervals, four whereof are tones, and the reſt greater ſemi-tones, and chromatically of ten ſemitones, ſix whereof are greater, and four leſs; it takes its form from the ratio quadriparziente quinto, as 9 : 5. The third, called by the Italians il ditono con diapente, or ſettimo maggiore, is compoſed diatonically of ſeven degrees, like the former, and ſix intervals, five whereof are tones and a major ſemi-tone, ſo that only a major ſemi-tone is wanting to make up the octave, and chromatically of twelve ſemi-tones, ſix greater and ſix leſs. It takes its form from the ratio of 15 : 8. The fourth is redundant, and compoſed of five tones, a greater ſemi-tone and a leſs, ſo that it wants only a comma of an octave, that is, ſo much as to make its ſecond ſemitone greater, called pentatonon. Hence many confound it with the octave, maintaining with good reaſon, that only the three firſt ſeventhes can be of any uſe.

SEVER, a town of France, in the province of Gaſcony, ſituated on the river Adour, thirty-eight miles north-eaſt of Bayonne.

SEVERAL, a term much uſed in law: thus ſeveral action, ſignifies an action wherein two or more are ſeverally charged. See ACTION.

Several covenant, that entered into by two or more perſons ſeverally. Any ſuch covenant, though contained in one deed or writing, is deemed as ſeveral deeds wrote on the ſame piece of paper or parchment. See COVENANT.

Several inheritance, is when an inheritance is conveyed ſo as to deſcend to two perſons ſeverally by moieties, *&c.* See the article INHERITANCE.

Several tail, ſignifies that eſtate or land which is intailed ſeverally on two; as where lands are given to two men and their wives, and to the heirs of their bodies to be lawfully begotten, in which caſe the donees hold jointly for their two lives, and at the ſame time have a ſeveral or ſeparate inheritance: for the iſſue of the one ſhall have his moiety in tail, and the iſſue of the other his. See TAIL.

Several tenancy, is a plea or exception to a writ which is taken out againſt two perſons as joint-tenants, who in fact are ſeveral. See TENANCY.

SEVERANCE, in law, the ſingling or ſeparating of two or more joined in one writ. According to Hale there are two kinds of ſeverances, one where a plaintiff will not appear, and the other where ſeveral plaintiffs appear, but ſome of them will not proceed in the ſuit. Severance is allowed as well in real as in perſonal actions. There is a ſeverance of the tenants in aſſiſe, which is where one or two diſſeiſes appear upon the writ, and not the other. There is alſo ſeverance in in debt, as where two or more executors are plaintiffs in a ſuit, and one of them refuſes to proſecute. Likewiſe if in a writ of error there are ſeveral plaintiffs, and the one only aſſigns errors, or in caſe the other releaſe the ſame, this will not

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be good without ſummoning and ſevering the reſt. Where there is a ſeverance of joint tenants, in ſuch caſe the proſecution of the ſuit is ſevered, but not the eſtate in the lands, *&c.* And upon ſuing out a writ of ſummons and ſeverance, if the party does not come in thereon, the other ſhall have judgment *ad proſequendum ſolum*, to proſecute alone, which may be done in the court of king's bench by giving a rule, *&c.*

SEVERANCE *of corn*, ſignifies the cutting and carrying the ſame off the ground; and ſometimes it is taken for the ſetting out the tithe from the reſt of the corn.

SEVERINO ST. a city of Naples, in the province of Calabria, ſituated eaſt long. 17° 30′, north lat. 39° 16′. This is alſo the name of a town in the pope's territories and marquiſate of Ancona, ſituated twenty miles ſouth-eaſt of Loretto.

SEVERN, a river of ſouth-Britain, which riſing in Montgomery-ſhire, runs eaſt till it enters Shropſhire; and having paſſed by Shrewſbury turns ſouth, and diſcharges itſelf into the Briſtol-channel.

SEVIERO, a town of Italy, in the kingdom of Naples, and territory of Capitinat: ſituated in eaſt long. 16° 12′, north lat. 41° 32′.

SEVILLE, a city of Spain, capital of the province of Andaluſia, ſituated on the river Guadalquivir, in weſt long. 6°, north lat. 37° 15′.

SEVOLD, or SEGEWOLD, a town of Livonia, ſituated thirty miles north-eaſt of Riga.

SEVUM, or SEBUM, SUET, in anatomy. See SUET.

SEWER, in the houſhold, an officer who comes in before the meat of a king or nobleman, to place and range it on the table.

SEWER is alſo a paſſage or gutter made to carry water into the ſea or a river, whereby to preſerve the land, *&c.* from inundations and other annoyances. The buſineſs of the commiſſioners of ſewers, or their office in particular, is to repair ſea-banks and walls, ſurvey rivers, public ſtreams, ditches, *&c.* and to make orders for that purpoſe. See the article COMMISSION.

Theſe commiſſioners have likewiſe authority to make enquiry of all nuſances or offences committed by the ſtopping of rivers, erecting mills, not repairing banks, bridges, *&c.* and to tax perſons chargeable for the amending of defaults that tend to the obſtruction or hindrance of the free paſſage of the water through its antient courſes. They may not only make a rate and aſſeſſment for repairs, but alſo may decree lands to be ſold, in order to levy charges aſſeſſed, upon non-payment thereof, *&c.* But the decrees of the commiſſioners are to be certified into chancery, and have the king's aſſent to be binding, and their proceedings are ſubject to the juriſdiction of the king's-bench. In the making of a rate or tax, the commiſſioners are to aſſeſs every owner or poſſeſſor of lands in danger of receiving any damage by the waters, equally according to the quality of their lands, rents, and numbers of acres, and their reſpective portions and profits, whether it be of paſture, fiſhing, *&c.* And where no perſons or lands can be known that are liable to make repairs of banks and ſewers, then the commiſſioners are to rate the whole level. The 3. Jac. I. ordains that all ditches, banks, bridges, and water-houſes, within two miles of London, adjoining to, and falling into the Thames, ſhall be ſubject to the commiſſioners of ſewers. Alſo the lord-mayor, *&c.* may appoint perſons in that caſe to have the power of commiſſioners of ſewers. Perſons breaking down ſea-banks, whereby lands are damaged, are adjudged to be guilty of felony; and removing piles, *&c.* forfeit twenty pounds, by 6 and 10 Geo. II. c. 32.

SEX, *ſexus*, ſomething in the body which diſtinguiſhes male from female.

SEXAGENARY, ſomething relating to the number ſixty: thus ſexagenary or ſexageſimal arithmetic, is a method of computation proceeding by ſixties; ſuch is that uſed in the diviſion of a degree into ſixty minutes, of the minute into ſixty ſeconds, of the ſecond into ſixty thirds, *&c.* Alſo ſexagenary tables are tables of proportional parts, ſhewing the product of two ſexagenaries that are to be multiplied, or the quotient of the two that are to be divided.

SEXAGESIMA, the ſecond ſunday before Lent, or the next to Shrove-ſunday, ſo called as being about the ſixtieth day before Eaſter.

SEXAGESIMALS, or SEXAGESIMAL FRACTIONS, fractions whoſe denominators proceed in a ſexagecuple ratio; that is, a prime, or the firſt minute $= \frac{1}{60}$; a ſecond $= \frac{1}{3600}$; a third $= \frac{1}{216000}$.

Antiently

Antiently there were no other than ſexageſimals uſed in aſtronomy, and they are ſtill retained in many caſes, though decimal arithmetic begins to grow in uſe now in aſtronomical calculations. In theſe fractions, which ſome call aſtronomical fractions, the denominator being always ſixty, or a multiple thereof, is uſually omitted, and the numerator only written down, thus, 4°, $59'$, $32''$, $50'''$, $16''''$, is to be read four degrees, fifty-nine minutes, thirty-two ſeconds, fifty thirds, ſixteen fourths, *&c.*

SEXANGLE, in geometry, a figure having ſix ſides, and conſequently ſix angles.

SEXTANS, *ſextant*, a ſixth part of certain things. The Romans having divided their as into twelve ounces, or unica, the ſixth part of that, or two ounces, was the ſextans.

Sextans was alſo a meaſure which contained two ounces of liquor, or two cyathi. See MEASURE.

SEXTANT, in mathematics, denotes the ſixth part of a circle, or an arch comprehending ſixty degrees. See the article CIRCLE.

The word ſextant is more particularly uſed for an aſtronomical inſtrument made like a quadrant, excepting that its limb only comprehends ſixty degrees. The uſe and application of the ſextant is the ſame with that of the quadrant. See the article QUADRANT.

SEXTARIUS, an antient roman meaſure. See the article MEASURE.

SEXTERY LANDS, ſignifies lands formerly given to a church, or religious houſe, for the maintenance of a ſexton. See the article SEXTON.

SEXTILE, *ſextilis*, the poſition or aſpect of two planets when at ſixty degrees diſtance, or at the diſtance of two ſigns from one another. It is marked thus (✶). See ASPECT.

SEXTON, a church-officer, whoſe buſineſs is to take care of the veſſels, veſtments, *&c.* belonging to the church, and to attend the miniſter, church-wardens, *&c.* at church. He is uſually choſen by the parſon only. The office of ſexton, in the pope's chapel, is appropriated to the order of the hermits of St. Auguſtine. He is generally a biſhop, though ſometimes the pope only gives a biſhopric in particular to him on whom he confers the poſt: he takes the title of prefect of the pope's ſacriſty, and has the keeping of the veſſels of gold and ſilver, the relics, *&c.* When the pope ſays maſs the ſexton always taſtes the bread and wine firſt. If it be in private he ſays maſs, his holineſs of two wafers gives him one to eat; and if in public, the cardinal who aſſiſts the pope in quality of deacon, of three wafers gives him one to eat. When the pope is very ſick he adminiſters to him the ſacrament of extreme unction, *&c.* and enters the conclave in quality of firſt conclaviſt.

SEXTUPLE, *ſeſtuplo*, in muſic, denotes a mixed ſort of triple which is beaten in double time. See TRIPLE.

Authors uſually make mention of three ſpecies hereof, to which Mr. Broſſard adds two others, five in all, which are theſe: ſextuple of a ſemi-breve, called by the French triple of 6 for 1, as being denoted by the numbers $\frac{6}{1}$; or becauſe here are required ſix ſemi-breves to a meaſure inſtead of one, in common time, three for the riſing and three for the falling of the hand. Sextuple of a minim, called by the French 6 for 2, as being denoted by $\frac{6}{2}$, which ſhews that ſix minims muſt be contained in a bar, whereof two are ſufficient in common time. Sextuple of a crotchet, called by the French triple of 6 for 4, becauſe denoted by $C\frac{6}{4}$, wherein ſix crotchets are contained in the bar inſtead of four. Sextuple of the chroma, denominated 6 for 8 by the French, as being denoted by $\frac{6}{8}$, which ſhew that ſix quavers here make a bar, or ſemi-breve, inſtead of eight in common time. Sextuple of the ſemi-chroma, or triple of 6 for 16, ſo called as being denoted by the figures $\frac{6}{16}$, which ſhews that ſix quavers are here required to a meaſure inſtead of ſixteen. See the article TIME, *&c.*

SEXUALISTÆ, among botanical writers, thoſe who have eſtabliſhed the claſſes of plants upon the differences of the ſexes and parts of fructification in plants, according to the modern method, as Linnæus, *&c.* See the article BOTANY.

SEYNE, a river of France, which riſing near Dijon, in Burgundy, runs north-weſt through Champain and the iſle of France, through Paris, *&c.* and croſſing Normandy falls into the Britiſh-channel, between Havre-de-grace and Honfleur.

SGRAFFIT, *ſgraffiata*, in painting, denotes ſcratch-work, a method of painting

ing in black and white only, not in freſco, yet ſuch as will bear the weather. Sgraffit performs both the deſign and painting all in one. It is chiefly uſed to embelliſh the fronts of palaces and other magnificent buildings.

SHACK, in antient cuſtoms, a liberty of winter paſturage. In the counties of Norfolk and Suffolk, the lord of the manor has ſhack; that is, a liberty of feeding his ſheep at pleaſure in his tenants lands, during the ſix winter months.

SHACKLES, or SHAKLES. See the article SHAKLES.

SHAD, *alauſa*, in ichthyology, a ſpecies of clupea, with the upper jaw bifid at the extremity, and ſpotted with black: it greatly reſembles the common herring, and is, on that account, ſometimes called the mother of herring: all the fins are whitiſh, except that on the back: the tail is very much forked.

SHADOW, *umbra*, in optics, a privation or diminution of light, by the interpoſition of an opake body; or, it is a plane where the light is either altogether obſtructed, or greatly weakened, by the interpoſition of ſome opake body between it and the luminary.

A ſhadow of itſelf is inviſible; and, therefore, when we ſay we ſee a ſhadow, we partly mean that we ſee bodies placed in the ſhadow, and illuminated by light reflected from collateral bodies; and, partly, that we ſee the confines of the light. See the article LIGHT.

If the opake body that projects the ſhadow be perpendicular to the horizon, and the place it is projected on be horizontal, the ſhadow is called a right ſhadow; and ſuch are the ſhadows of men, trees, buildings, mountains, *&c.* But if the opake body be placed parallel to the horizon, the ſhadow is called a verſed ſhadow; as the arms of a man ſtretched out, *&c.*

The laws of the projection of SHADOWS *from opake bodies.* 1. Every opake body projects a ſhadow in the ſame direction with its rays; that is, towards the part oppoſite to the light. Hence, as either the luminary or the body changes place, the ſhadow likewiſe changes. 2. Every opake body projects as many ſhadows as there are luminaries to enlighten it. 3. As the light of the luminary is more intenſe, the ſhadow is the deeper: hence the intenſity of the ſhadow is meaſured by the degrees of light that ſpace is deprived of. 4. If a luminous ſphere be equal to an opake one it illuminates, the ſhadow, which this latter projects, will be a cylinder, and conſequently will be propagated ſtill equal to itſelf, to whatever diſtance the luminary is capable of acting; ſo that if it be cut in any place, the plane of the ſection will be a circle, equal to a great circle of the opake ſphere. 5. If the luminous ſphere be greater than the opake one, the ſhadow will be conical. If, therefore, the ſhadow be cut by a plane, parallel to the baſe, the plane of the ſection will be a circle; and that ſo much the leſs as it is a greater diſtance from the baſe. 6. If the luminous ſphere be leſs than an opake one, the ſhadow will be a truncated cone; and, conſequently, grows ſtill wider and wider; and therefore, if cut by a plane, parallel to the ſection, that plane will be a circle, ſo much the greater as it is further from the baſe.

Of SHADOWS *from the ſun.* The ſun being vaſtly larger than the whole globe of the earth, muſt give all its ſhadows pointed, by reaſon it illumines more than half of them.

In conſequence of this demonſtration, we might conclude, that all the ſun's ſhadows muſt be leſs than the bodies that project them, and diminiſhed more and more as they recede further and further. Now this would be true were there any relation between the body illuminated and the body illumining; but as all objects on the earth are ſo ſmall in compariſon of that ſtar, the diminution of their ſhadows is imperceptible to the eye, which ſees them always equal; *i. e.* either broader or narrower than the body that forms them: on this account all the ſhadows cauſed by the ſun are made in parallels.

From the whole it appears, that to find the ſhadow of any body whatever oppoſed to the ſun, a line muſt be drawn from the top of the luminary perpendiular to the place where the foot of the luminary is to be taken: and through this place an occult line is to be drawn through one of the angles of the plan of the object, and another from the ſun to the ſame angle; and the interſection of the two lines will ſhew how far the ſhadow is to go: all the other lines muſt be drawn parallel hereto.

The

Fig. 1. SEED.

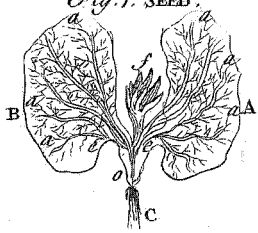


Fig. 2. SEGMENT

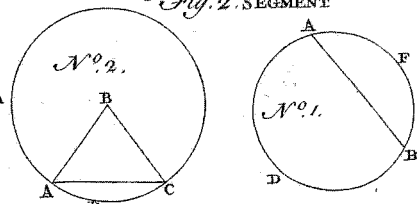
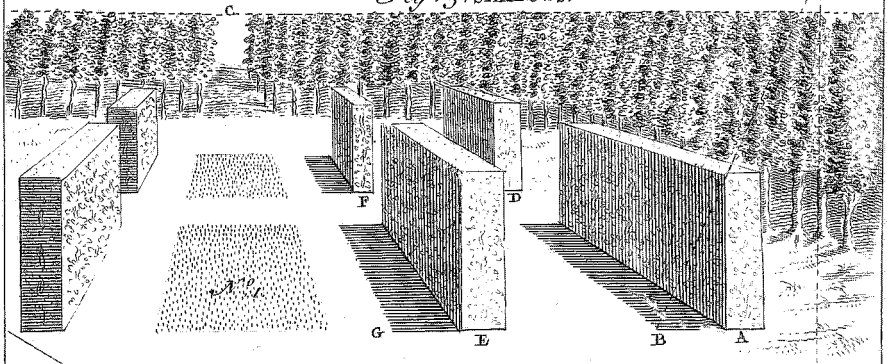
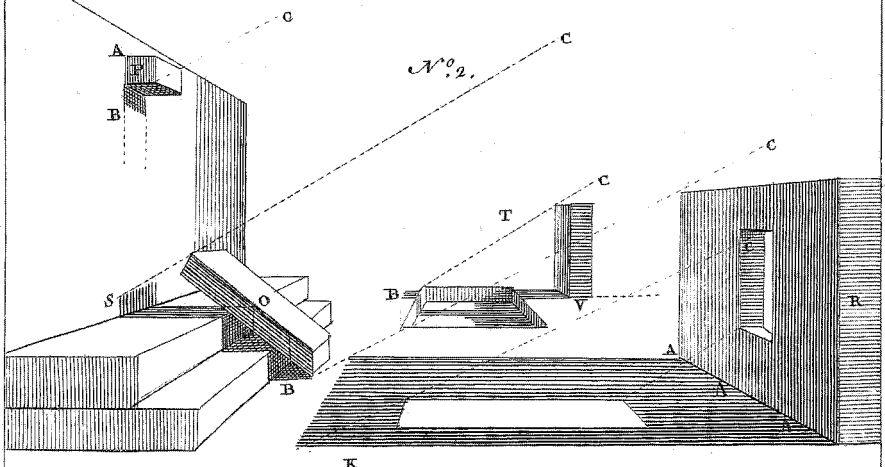
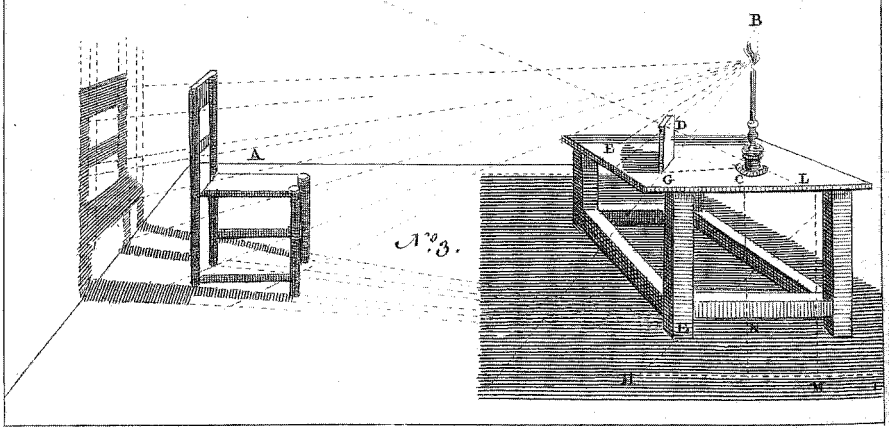


Fig. 3. SHADOWS.







J. Jefferys sculp.

The ſhadows of the ſun are equal in objects of the ſame height, though at a diſtance from each other. See plate CCXLIV. fig. 3. n° 1.

Experience teaches, that ſtiles, or elevations of the ſame height, removed to a diſtance from each other, do yet project equal ſhadows at the ſame time: for they are lengthening and ſhortening, in proportion as the ſun comes nearer, or recedes further off; one or other of which he is continually doing.

For this reaſon, when the ſhadow of an object is to be caſt any way, you muſt determine the place of the ſun, and the point underneath, to draw two occult lines from the ſame, for the extremity of the ſhadow; as here the paliſade A gives the extreme of its ſhadow in B: and if from this point B, you draw a point of ſight C, this line B C will be the ſhadow of the paliſade D, as well as that of A, and of all the reſt in the ſame line to the very point of ſight.

In effect, it muſt be held for a certain maxim, that ſhadows always retain the ſame point of ſight as the objects. On the footing of this obſervation, that objects of the ſame height give equal ſhadows: if you would give the ſhadow of the paliſades, E, F, which are of the ſame height as A, D, take in your compaſſes the diſtance A D, and ſet it on the foot of the paliſade E, by which you will have E G; then from G draw a line to the point of ſight C; and thus you are to proceed, let the number of walks be ever ſo great.

Though the ſun is made to appear in this figure, it muſt not be ſuppoſed that he is ſo near the objects; the deſign being only to ſhew, that the rays proceed from him in this manner, when at ſuch a height, though far without the limits of the piece; as *ibid.* n° 2. which yet has the line for the foot of the object A B; and thoſe of the rays of the ſun C, C, C, becauſe theſe are always required for finding the extremities of the ſhadows.

The ſhadow of the object O is found by continuing the line A B, and making it riſe over the ſteps, and againſt the wall, till cut by the ray in the point S, by the rays paſſing over the corner of the object, and from S drawing a line to the point of ſight T.

To find the ſhadow of the object P, it muſt be remembered that the foot of the light muſt always be ſuppoſed on the plane where the object is placed. Accordingly, the ray C, cutting the little line A B, ſhews how far the ſhadow of the little object P muſt go, to be thence drawn to the point of ſight T. The object V caſts its ſhadow all along, though in its way it deſcends into a ditch.

The ſhadow of the wall R is found by the ſame rule as the reſt; as appears from the lines A B and the ray C.

SHADOWS *by torch-light*. The ſhadow of an erect pyramid by torch-light falls as it would by the light of the ſun; and in both caſes there is but one line, whereon the vertical point of the pyramid will be found.

Upon the planes B C D E (pl. CCXLV. fig. 1.) draw the diagonals E B and D C; through the central point F, raiſe the perpendicular F A; and from the four points, B, C, D, E, draw lines to the point A, and the pyramid will be erected.

Then, to find its ſhadow, draw an indefinite line from its baſis G of the illuminating body, paſſing through F; and from the central flame of the torch H draw another line over the vertex of the pyramid in the line G F, till it cut the point I, which point will limit the ſhadow of the pyramid.

Laſtly, draw a line from C to I, and another from E to I, and the triangle C I E will be the ſhadow of the pyramid.

To gain the ſhadow of an inverted pyramid, draw perpendicular lines from the angular points of its baſe, and form the ſubjacent plane, by means thereof, after the manner directed for the ſun.

And from all the angles of this plane draw lines to the baſe of the torch G; then from H, the central point of the flame, draw other lines touching all the angles of the baſe of the inverted pyramid, and dividing thoſe of the plane, whereby the ſhadow will be defined.

Shadows from the ſun are caſt all the ſame way, and have the ſame diſpoſition; it being impoſſible that the ſun ſhould occaſion one ſhadow towards the eaſt, and another towards the weſt, at the ſame time.

It is true, in different times of the day, it makes this difference; but never in one and the ſame hour.

But the torch, candle, and lamp, have always this effect; for in what place ſoever one of theſe luminaries be found,

provided there be a number of objects about them, the ſhadows will be caſt various ways; ſome to the eaſt, ſome to the weſt, ſome to the north, and others to the ſouth, according to the ſituation of the objects around the luminary: the foot of which, here repreſented by A, (*ibid.* fig. 2.) ſerves as a common center, from which they all proceed: and the flame, here repreſented by B, ſhews where they are to terminate, though at different diſtances; as the neareſt produce the ſhorteſt ſhadows, and the remoteſt the longeſt.

SHADOWS *on ſeveral parallel planes.* The firſt plane here is the floor, whereon the chair A (pl. CCXLIV. fig. 3. n° 3.) ſtands; the ſecond plane is the upper part of the table, parallel to the firſt, and may be either above or below it. There might alſo be more of theſe planes, wherein to find the foot of the illuminating body, in order to come at the ſhadow of the object. Suppoſe the foot of the illuminating body to be C, and the upper flame B; from the points C and B draw lines through the upper and under parts of the object D, which will give the ſhadow E upon the table.

To find the ſhadow of the chair A, which is placed on the ground, determine the foot of the luminary on the table in C on the ground: this is eaſy by the following inſtructions. From the point of diſtance, which is here ſuppoſed to be without the limits of the paper, draw a line through the foot of the table F; then from the angle G upon the table let fall a perpendicular, cutting the line F in the point H, and from H draw a parallel to the baſe H I, which is equal to the upper part of the table, and will direct to the thing required. For drawing a line from the point of ſight K, through the foot of the luminary C, to the extremity of the table L; from the ſame point L, let fall a perpendicular to H I, which will give the point M.

Then from M draw a line to the point of ſight K, in which line M K the foot of the luminary will be found.

To determine the preciſe point, let fall a perpendicular from the point C, which, cutting the line M H, will give the point N for the foot of the luminary.

This point N being thus found, there will be no difficulty in finding the ſhadow of the chair A, the method being the ſame as for the other objects taught before, that is, from the foot of the luminary N draw lines through all the angles of the plane of the chair, and other lines through the upper part of the chair from the luminary B; theſe latter, by interſecting the former, expreſs the bounds of the ſhadow. For the reſt, the figure gives ſufficient directions.

When two luminaries ſhine on the ſame object, two ſhadows muſt be produced; each of the luminaries occaſioning its reſpective ſhadow, and that in proportion to the circumſtances of the luminary.

If ſuch luminaries, when at equal diſtances, be equal, the ſhadows themſelves muſt be equal: but if there be any diſproportion, that is, if one of them be a little bigger than the other, or one of them a little nearer the object than the other, the ſhadows will be unequal.

Thus the object O, (pl. CCXLV. fig. 3.) being illuminated by two candles, the one near at hand in P, the other farther off in Q, it is evident the ſhadow of the candle P will be deeper than that of the candle Q, as is expreſſed in the figure.

The rules for ſuch ſhadows are the ſame with thoſe already given, both for the ſun and the torch.

From what has been obſerved before may be drawn this concluſion, that the ſame object may project ſhadows of divers forms, though ſtill illumined on the ſame ſide; the ſun giving one form, the torch another, and the day-light no preciſe form at all.

The ſun always makes its ſhadow equal to the object, that is, projects it parallelwiſe.

It is certainly of conſequence to all painters, engravers, &c. to obſerve theſe rules preciſely, and not to take the rules for candles, lamps, and the like, in lieu thereof, as is too frequently done.

The ſhadow of a torch, or flambeau, is not projected in parallel lines, but in rays proceeding from a center, whence the ſhadow is never equal to the body, but always bigger, and grows more ſo as it recedes farther off. It appears therefore a groſs abuſe to repreſent the ſhadow of a torch like that of the ſun, and the ſhadow of the ſun like that of a candle, when the difference is ſo conſiderable.

There is a third kind of ſhadow, neither produced by the ſun nor a torch; but only a fine ſunny day, which wanting ſtrength to finiſh and define its form, occaſions a dimneſs near the object. Now for this there is no certain rule, but every body conducts it at diſcretion.

SHADOWS

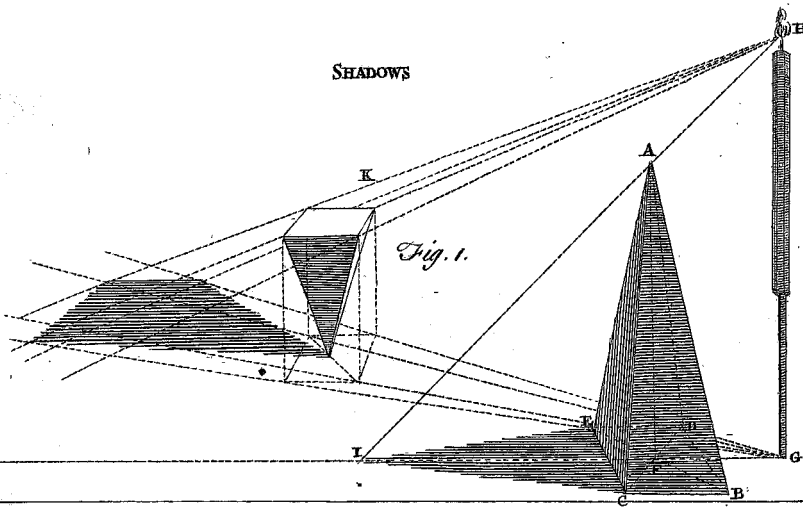


Fig. 1.

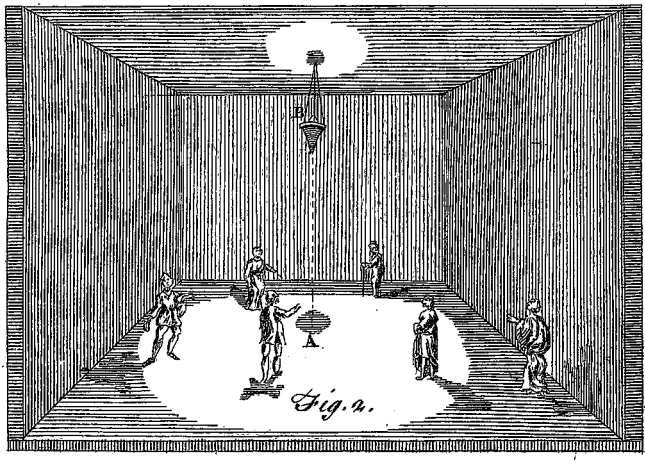


Fig. 2.

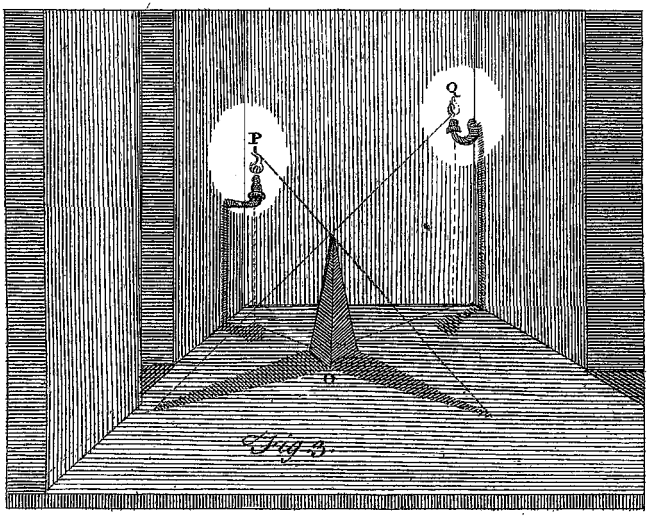


Fig. 3.

T. Jefferys sculp

All theſe ſhadows, both of the ſun, of the torch, and of the day-light, muſt appear darker than the parts of objects not illumined; and that part of the ſhadow that is moſt remote from the object muſt be ſtill darker than that nearer it.

SHADOW, in geography. The inhabitants of the terraqueous globe of the earth receive different denominations, according to the different ways wherein their ſhadows are projected; as aſcii, amphiſcii, heteroſcii, and periſcii. See the articles ASCII, *&c.*

SHADOW, in painting, an imitation of a real ſhadow, effected by gradually heightening and darkening the colours of ſuch figures, as by their diſpoſitions cannot receive any direct rays from the luminary that is ſuppoſed to enlighten the piece.

The management of the ſhadows and lights makes what the painters call claro-obſcuro. See CLARO-OBSCURO.

Geneſis of curves by SHADOWS. See the article CURVE.

SHAFT *of a column*, in building, is the body thereof between the baſe and capital: ſo called from its ſtraightneſs. See the article COLUMN.

The term ſhaft is alſo uſed for the ſpire of a church-ſteeple, and for the tunnel of a chimney. See the articles SPIRE and CHIMNEY.

SHAFT, in mining, is the pit or hollow entrance into it. See MINE.

SHAFTSBURY, a borough of Dorſetſhire, twenty-five miles north-eaſt of Dorcheſter; from whence the noble family of Cooper took the title of earl. It ſends two members to parliament.

SHAG, or SHAGG, in ornithology, a ſpecies of pelican, brown underneath, with twelve feathers in the tail; being very like the cormorant in ſhape, but of a different colour: it is about the ſize of a well fed duck, and is known among authors by the names corvus aquaticus minor, and graculus palmipes.

SHAGREEN, or CHAGREEN, in commerce, a kind of grained-leather, prepared, as is ſuppoſed, of the ſkin of a ſpecies of ſqualus, or hound-fiſh, called the ſhagree, or ſhagrain; and much uſed in covering caſes, books, *&c.*

It is imported from Conſtantinople, Tauris, Tripoli, Algiers, and from ſome parts of Poland, where it is prepared in the following manner: The ſkin being ſtretched out is firſt covered over with muſtard-ſeed, which is bruiſed upon it; and being thus expoſed to the weather for ſome days, it is then tanned.

The beſt is of a browniſh colour, as the white ſort is the worſt: it is extremely hard; yet, when ſteeped in water, it becomes ſoft and pliable; and being faſhioned into caſe-covers, it readily takes any colour, as red, green, yellow, black, according to the fancy of the workman.

Each ſhagreen ſkin pays, on importation, a duty of $4\frac{78\frac{3}{4}}{100}$ d. and draws back, on exportation, $4\frac{51\frac{1}{4}}{100}$ d.

SHAKLES, in a ſhip, are the rings with which the ports are ſhut faſt, by laſhing the port-bar to them. There are alſo ſhakles put upon bilbow-bolts, for confining the men who have deſerved corporal puniſhment.

SHALLOP, or SHALLOOP, a particular ſort of ſhip. See the article SHIP.

SHAMADE, ar CHAMADE. See the article CHAMADE.

SHAMBLES, among miners, a ſort of niches, or landing places, left at ſuch diſtances in the adits of mines, that the the ſhovel-men may conveniently throw up the ore from ſhamble to ſhamble, till it comes to the top of the mine. See DIGING, MINE, *&c.*

SHAMMY, or CHAMOIS-LEATHER, a kind of leather, dreſſed either in oil or tanned; and much eſteemed for its ſoftneſs, pliancy, and being capable of bearing ſoap without hurt.

The true ſhammy is prepared of the ſkin of the chamois-goat. See the article CHAMOIS.

In France, *&c.* ſome wear the ſkin crude without any preparation; it is alſo uſed for the purifying mercury, which is done by paſſing it through the pores of this ſkin, which are very cloſe. See the article MERCURY.

The true chamois leather is counterfeited with common goat, kid, and even ſheep-ſkin; the practice of which makes a particular profeſſion, called by the French chamoiſure. The laſt is the leaſt eſteemed, yet ſo popular, and ſuch vaſt quantities prepared, eſpecially about Orleans, Marſeilles, and Tholouſe, that it may not be amiſs to give the method of preparation.

The manner of chamoiſing, or of preparing ſheep, goat, or kid-ſkins in oil, in imitation of Chamois.

The ſkins being waſhed, drained, and ſmeared over with quick-lime, on the fleſhy ſide, are folded in two, lengthwiſe, the wool outwards, and laid on heaps, and ſo left to ferment eight days; or if they had been left to dry after fleaing, for fifteen days.

Then they are waſhed out, drained, and half-dried, laid on a wooden leg or horſe, the wool ſtripped off with a round ſtaff for the purpoſe, and laid in a weak pit, the lime whereof had been uſed before, and had loſt the greateſt part of its force.

After twenty-four hours they are taken out, and left to drain twenty-four more; then put in another ſtrong pit. This done, they are taken out, drained, and put in again by turns; which begins to diſpoſe them to take oil: and this practice they continue for ſix weeks in ſummer, or three months in winter; at the end whereof they are waſhed out, laid on the wooden leg, and the ſurface of the ſkin on the wool ſide peeled off, to render them the ſofter; then, made into parcels, ſteeped a night in the river; in winter, more; ſtretched ſix or ſeven over one another, on the wooden leg; and the knife paſſed ſtrongly on the fleſh-ſide, to take off any thing ſuperfluous, and render the ſkin ſmooth.

Then they are ſtretched as before, in the river, and the ſame operation repeated on the wool-ſide; then thrown into a tub of water with bran in it, which is brewed among the ſkins till the greateſt part ſtick to them; and then ſeparated into diſtinct tubs, till they ſwell and riſe of themſelves above the water.

By this means, the remains of the lime are cleared out: they are then wrung out, hung up to dry on ropes, and ſent to the mill, with the quantity of oil neceſſary to fill them: the beſt oil is that of ſtock-fiſh.

Here they are firſt thrown in bundles into the river for twelve hours, then laid in the mill-trough, and fulled without oil till they be well ſoftened; then oiled with the hand, one by one, and thus formed into parcels of four ſkins each, which are milled and dried on cords a ſecond time, then a third; then oiled again and dried.

This proceſs is repeated as often as neceſſity requires: when done, if there be any moiſture remaining, they are dried in a ſtove, and made up into parcels wrapped up in wool; after ſome time they are opened to the air, but wrapped up again as before, till ſuch time as the oil ſeems to have loſt all its force, which it ordinarily does in twenty-four hours.

The ſkins are then returned from the mill to the chamoiſer to be ſcoured; which is done by putting them into a lixivium of wood-aſhes, working and beating them in it with poles, and leaving them to ſteep till the lye have had its effect; then wrung out, ſteeped in another lixivium, wrung again, and this repeated till all the greaſe and oil be purged out. They are then half dried, and paſſed over a ſharp-edged iron inſtrument, placed perpendicular in a block, which opens, ſoftens, and makes them gentle: laſtly, they are thoroughly dried, and paſſed over the ſame inſtrument again, which finiſhes the preparation, and leaves them in form of chamois.

Kid and goat-ſkins are chamoiſed in the ſame manner as thoſe of ſheep, excepting that the hair is taken off without the uſe of any lime; and that when brought from the mill they undergo a particular preparation called ramalling, the moſt delicate and difficult of all the others.

It conſiſts in this, that as ſoon as brought from the mill they are ſteeped in a fit lixivium: taken out, ſtretched on a round wooden leg, and the hair ſcraped off with the knife; this makes them ſmooth, and in working caſt a fine nap. The difficulty is in ſcraping them evenly.

SHANK, in the manege, that part of a horſe's fore-leg which lies between the knee and the fetlock.

SHANK-PAINTER, in a ſhip, a ſhort chain faſtened under the fore-ſhrouds, by a bolt, to the ſhip's ſide; having at the other end a rope ſpliced to the chain, on which the after-part of the anchor reſts when it lies by the ſhip's ſide.

SHANKER, or CHANCRE, in medicine, a malignant ulcer, uſually occaſioned by ſome venereal diſorder. See the articles GONORRHOEA and POX.

Shankers are generally ſituated on thoſe parts which have a fine and tender covering, as the inward duplicature of the prepuce in men, the inſide of the pudenda in women, the nipples of nurſes, and the lips and tongue of proſtitutes: in very bad caſes they will appear on the dorſum penis, as well as on the pubes and inſide of the thighs.

In the cure of a recent ſhanker, Aſtruc firſt orders bleeding, to abate the inflammation, then fomentations to reſolve the induration; not omitting mercurials in the mean time, but ſo as to avoid a ſalivation. After which he adviſes the uſe of ſudorific decoctions of china, ſarſaparilla, guaiacum, and ſaſſafras boiled with antimony. In ſlight ſhankers, he recommends an ointment made of lapis calaminaris, half an ounce; of ſulphur and quickſilver, each one dram; which are to be mixed with a ſufficient quantity of turpentine to make an ointment. Cockburn ſays, any ſhanker may be cured with an ointment of quickſilver and turpentine, without farther trouble; and Heiſter approves of the ſame method. Turner ſays, he always found ſmoaking the parts with cinnabar ſucceſsful in ſhancrous ulcerations on the glans and prepuce of men, as well as the labia and ſinus pudoris of women. His method was, to throw a dram of cinnabar on a hot iron, letting a fume aſcend through a funnel, or a ſeat perforated like a cloſe-ſtool all round the diſeaſed parts. This was done every day, and ſometimes twice a day, for a week; the iron being hot enough to raiſe a flame with ſmoak, but not ſo fiery hot as to make it inſtantly conſume in flame alone.

SHANNON, the largeſt river in Ireland, which riſing in the county of Leſtrim, runs ſouthwards, dividing the provinces of Leinſter and Connaught; and then turning ſouth-weſt, runs through the province of Munſter; and paſſing by the city of Limeric, afterwards falls into the weſtern or Atlantic-ocean.

SHARE *of a plough*, that part which cuts the ground, the extremity forewards being covered with a ſharp-pointed iron, called the point of the ſhare; and the end of the wood behind, the tail of the ſhare. See PLOUGH.

The length of the whole ſhare, from point to tail, according to Tull, ſhould be three feet nine inches: at the top of the iron it has an upright piece, called the fin; and near the iron, at the other end, there is an oblong ſquared hollow, called the ſocket; the uſe of which is to receive the bottom of the ſheat. Near the tail there is a thin plate of iron, well rivetted to the wood; by means of this plate the tail of the ſhare is held firmly to the hinder ſheat of the plough by a ſmall iron pin, with a ſcrew at the end, and a nut ſcrewed on it, on the inner or right ſide of the ſheat.

The point of the ſhare is that part in which it does not run up into the fin: this point is generally made of three inches and a half in length, and ſhould be flat underneath and round at top, and the lower part of it muſt be of hard ſteel. The edge of the fin ſhould alſo be well ſteeled, and ſhould make an acute angle with the ſhare.

The ſocket is a ſort of mortiſe; it ſhould be a foot long, and about two inches deep: the fore end of it muſt not be perpendicular, but oblique, conformable to the end of the ſheat which enters into it. The upper edge of the fore part muſt be always made to bear againſt the ſheat; but if this end of the ſocket ſhould not be quite ſo oblique as the ſheat, it may be helped by paring off a ſmall part of the wood at the point.

SHARK, in ichthyology, the engliſh name of two ſpecies of ſqualus, diſtinguiſhed by their different colours, blue and white. See SQUALUS.

The blue ſhark, with a triangular foſſula on the back, and no foramina at the eyes, is a moſt terrible fiſh of prey; growing to ſix, ſeven, or eight feet in length, and conſiderably thick in proportion: the mouth is large, and furniſhed with large broad teeth, ſome of them ſerrated at the edges.

The white ſhark is flat-backed, and has more numerous teeth than the preceding ſpecies, being the largeſt of the whole genus of ſquali; and weighing, when full grown, not leſs than a thouſand pounds: it is called by authors lamia, and canis carcharius.

There is alſo another ſpecies called the zygæna, or hammer-headed ſhark. See the article ZYGÆNA.

SHARP, in muſic, a kind of artificial note; for the character and uſe of which, ſee the articles CHARACTER, FLAT, SCALE, *&c.*

SHARP, in the ſea-language, ſignifies to hale taut, or tight.

SHARPING-CORN, a cuſtomary gift of corn, ſaid to be half a buſhel, for a plough-land, which the farmers pay in ſome parts of England to their ſmith, every Chriſtmas, for ſharping their plough-irons, harrow-tines, *&c.*

SHARPLING, one of the many names for the gaſteroſteus. See the article GASTEROSTEUS.

SHASTER,

SHASTER, or SHASTRAM, a ſacred book, containing the religion of the Banians: it conſiſts of three tracts; the firſt of which contains their moral law; the ſecond, the ceremonial; and the third, delivers the peculiar obſervances for each tribe of Indians.

SHAW, in our old writers, ſignifies a grove of trees.

SHEADING, a term uſed in the Iſle of Man for a riding, tything, or diviſion of that iſle; the whole being divided into ſix of theſe ſheadings; in each of which there is a coroner or conſtable, who is appointed by the delivery of a rod at the tinewald-court, or annual convention.

SHEARING, or SHEERING. See the article SHEERING.

SHEAT *of a plough*, a part paſſing through the beam, and faſtened to the ſhare. See the articles PLOUGH and SHARE.

SHEATHING, in the ſea-language, is the caſing that part of a ſhip, which is to be under water, with fir-board of an inch thick; firſt laying hair and tar, mixed together, under the boards, and then nailing them on, in order to prevent worms from eating the ſhip's bottom.

SHEATS, in a ſhip, are ropes bent to the clews of the ſails; ſerving, in the lower ſails, to haul aft the clews of the ſail; but, in top-ſails, they ſerve to haul home the clew of the ſail cloſe to the yard-arm.

SHEEP, *ovis*, in zoology, a well known genus of quadrupeds, the horns of which are hollow, bent backward, twiſted, and rugoſe: the fore-teeth are eight, and the hinder ones are narrower than the others: there are no canine, or dog-teeth.

Authors mention ſeveral ſpecies of ſheep. 1. The common kind, with compreſſed and lunated horns; a very valuable, and not uncomely creature, covered with a thick and deep wool, curled and twiſted. 2. The cretic ſheep, with erect and ſpiral horns, and about the ſize of the common kind, which it greatly reſembles in form. 3. The angola-ſheep, with pendulous ears, a lax dewlap, and with the back of the head prominent: this ſpecies differs greatly from the common kind.

As to the choice of ſheep to breed, the ram ſhould be young, and his ſkin of the ſame colour with his wool, for the lambs will be of the ſame colour with his ſkin. He ſhould have a large long body, a broad forehead, round, and well riſing, large eyes, and ſtrait and ſhort noſtrils. The polled ſheep, that is thoſe which have no horns, are found to be the beſt breeders. The ewe ſhould have a broad back, a large bending neck, ſmall, but ſhort, clean and nimble legs, and a thick deep wool covering her all over. To know whether they be ſound or not, the farmer ſhould examine the wool, that none of it be wanting, and ſee that the gums be red, the teeth white and even, the briſket-ſkin red, the wool firm, the breath ſweet, and the feet not hot. Two years old is the beſt time for beginning to breed, and their firſt lambs ſhould not be kept too long, to weaken them by ſuckling, but be ſold as ſoon as conveniently may be. They will breed advantageouſly, till they are ſeven years old.

The farmers have a method of knowing the age of a ſheep, as that of a horſe is known by the mouth. When a ſheep is one ſhear, as they expreſs it, it has two broad teeth before; when it is two ſhears, it will have four; when three, ſix; and when four, eight: after this, their mouths begin to break. The difference of land makes a very great difference in the ſheep. The fat paſtures breed ſtrait, tall ſheep, and the barren hills and downs breed ſquare ſhort ones; woods and mountains breed tall and ſlender ſheep; but the beſt of all are thoſe bred upon new-plowed land, and dry grounds. On the contrary, all wet and moiſt lands are bad for ſheep, eſpecially ſuch as are ſubject to be overflowed, and to have ſand and dirt left on them. The ſalt marſhes are, however, an exception to this general rule, for their ſaltneſs makes amends for their moiſture; any thing of ſalt, by reaſon of its drying quality, being of great advantage to ſheep.

Sheep's dung is one of the beſt manures we know, ſucceeding better on cold lands than any other dung whatever; but as it is not ſo eaſily collected as the dung of large animals, it is commonly conveyed to the land, it is intended for, by folding the ſheep upon it. See the articles DUNG and FOLDING.

Sheep-ſtealing, or killing them, in order to obtain their fat, *&c.* is felony without benefit of clergy.

SHEERING, or SHEARING, in woollen manufacture, is the cutting off, with large ſheers, the too long nap, in order to make the cloth more ſmooth and even. See the article CLOTH.

SHEERING,

SHEERING, in the ſea-language; when a ſhip is not ſteered ſteadily, they ſay ſhe ſheers, or goes ſheering; or, when at anchor, ſhe goes in and out, by means of the current of the tide, they alſo ſay ſhe ſheers.

SHEERS, in a ſhip, are two maſts ſet acroſs at the upper end of each other; a contrivance generally uſed for ſetting or taking out the maſts of a ſhip, where there is no hulk to do that office.

SHEEVES, or SHIVERS. See the article SHIVERS.

SHEFFIELD, a market-town of Yorkſhire, thirty-eight miles ſouth-weſt of York.

SHEFFORD, market-town of Bedfordſhire, ſeven miles ſouth of Bedford.

SHEFFNEL, a market-town of Shropſhire, fourteen miles eaſt of Shrewſbury.

SHEIK, an officer in the moſques of Egypt, whoſe buſineſs is the ſame with that of the imams of Conſtantinople. See IMAM.

SHEIK-BELLET, in the turkiſh affairs, a magiſtrate, anſwering to the mayor of a city with us.

SHEILDS, or SHEALS, a port-town of the biſhopric of Durham, ſituated at the mouth of the river Tyne, eight miles eaſt of Newcaſtle.

SHEKEL, in jewiſh antiquity, an antient coin, worth 2 s. $3\frac{1}{4}$ d. ſterling. See the article COIN.

Some are of opinion, that the Jews had two kinds of ſhekels, *viz.* the common one, already taken notice of, and the ſhekel of the ſanctuary; which laſt they make double the former, and conſequently equal to 4s. $6\frac{1}{2}$ d. But moſt authors make them the ſame; ſo that the ſhekel of the ſanctuary, according to them, is only worth 2 s. $3\frac{1}{4}$ d.

SHELF, among miners, the ſame with what they otherwiſe call faſt ground, or faſt country; being that part of the internal ſtructure of the earth, which they find lying even, and in an orderly manner, and, evidently having retained its primitive form and ſituation, unmoved by the waters of the general deluge, while the circumjacent, and upper ſtrata, have plainly been removed and toſſed about.

It is evident to reaſon, that there muſt have been a very violent concuſſion of the ſuperficial part of the earth, in the time of its being covered by the waters of the deluge; and experience as much evinces this as reaſon. Before this concuſſion it appears probable, that the uppermoſt ſurface of mineral veins, or loads, did in moſt places lie even with the then ſurface of the earth. The remains of this ſurface, found at different depths in digging, the miners expreſs by the word ſhelf. See MINE, TRACING, *&c.*

SHELL, *concha*, in natural hiſtory, a hard, and as it were ſtony covering, with which certain animals are defended, and thence called ſhell-fiſh.

As to the formation of a ſhell, it is now generally allowed to be formed by a viſcous fluid compoſed of glue, and ſeveral ſandy particles of an exquiſite fineneſs, which are tranſmitted through an infinite number of little channels to the pores where it tranſpires, condenſes, and hardens. When the animal increaſes in bulk, and the extremity of her body is not ſufficiently covered, it continues to evacuate and build in the ſame manner, finiſhing or repairing her habitation. This viſcous matter is proved, by undeniable experiments, to ariſe from the body of animals, and not from the ſhell, as ſome have imagined. Thoſe ſtreaks and clouds which we obſerve moſt ſhells to be beautified with, proceed, probably, from the different diſpoſition of the extreme parts of the animal's body that are viſible at the aperture of the ſhell, where we may frequently diſcover ſome minute lobes or lines of fleſh that differ from the reſt in colour, containing, perhaps, different juices which may acquire a particular complexion in that place; and many other different cauſes may concur to paint, vein, and diverſify the colours with a more or leſs lively glow. The quality of the food, the health or indiſpoſition of the animal, the inequality of its conſtitution according to the ſeveral periods of her age, and the changes that may happen to the different perforation of her ſkin; in ſhort, a thouſand accidents may intervene, to heighten or diminiſh certain tints, and diverſify the whole to infinity.

If the ſkill, in the variety of its colours, imitates the diverſity of the animal's pores, it is ſtill more apparent that it muſt aſſume the form of the body on which it is moulded. Thus we obſerve in all ſea ſhells, that if the animal has any ſwelling or inequality on its body, a tumor likewiſe riſes in the corresponding part of the incruſtation. When the creature diſplaces herſelf, and enlarges the dimenſions of her dwelling, the ſame tumor which had already raiſed the ſhell

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in one part, ſwells it anew at a little diſtance, by which means you ſee the ſame ſpecies of inequality in a winding line round the ſhell. Sometimes theſe protuberances of the animal are ſo large, or ſo pointed, that thoſe which riſe over them in the ſhell are like horns. She afterwards fills the inſides of theſe cavities, and then, by new evacuations of ſweat, ſtrikes out another ſet of horns, that protect her from fiſhes, who are fond of fleſh. If her body happens to be channeled, the ſhell that covers it has the ſame configuration: if the fleſh riſes in ſwellings, that wind round her in the form of a ſcrew, the ſhell has likewiſe its elevations and depreſſions, that are carried on in a ſpiral line from her tail to the extremity of her body.

The genera of ſhells are extremely numerous, and the ſpecies under many of them are alſo very much ſo. However, they may be divided into three ſeries or orders; the firſt comprehending all ſhells formed only of one piece, called by authors ſimple or univalve ſhells; the ſecond, all thoſe ſhells compoſed of two parts, or valves, under the name of bivalves; and the third, all ſhells compoſed of ſeveral parts, or valves, under the name of multivalves. See BIVALVE, MULTIVALVE, and UNIVALVE.

This method takes in all the ſhells hitherto known; the land, as well as the ſea-ſhells, being all comprehended under one or other of the foreſaid diviſions: indeed, all the recent land-ſhells are univalves; but the foſſile-ſhells belong to all the three ſeries. See plate CCXLVI.

Foſſile-SHELLS, thoſe found buried at great depths in earth, and often immerſed in the hardeſt ſtones. Theſe foſſile-ſhells, as well as thoſe found lying on the ſea-ſhore, make an excellent manure, eſpecially for cold clayey lands; upon which it does not produce nearly ſo great an effect for the two firſt years, as it does in the ſucceeding ones; the reaſon of which is, that it is not then ſufficiently mixed, but in ſucceeding time it breaks itſelf into a number of very ſmall particles, and theſe all become intimately blended with the molecules of earth, and produce their effect more properly.

Poliſhing of SHELLS. See POLISHING.

SHELTIE, a ſmall but ſtrong kind of horſe, ſo called from Shetland, or Zetland, where they are produced.

SHEPPEY, an iſland at the mouth of the river Medway, making part of the county of Kent.

SHEPTON-MALLET, a market-town, fifteen miles ſouth-weſt of Bath.

SHERARDIA, in botany, a genus of plants, belonging to the *tetrandria-monogynia* claſs: its flower is monopetalous and tubular, divided into four ſegments at the limb; and its fruit is an oblong body, ſeparable longitudinally into two oblong ſeeds, convex on one ſide, and plane on the other, and with three points at their ſummit.

SHERARDIA is alſo a name given to a plant, called by Linnæus galenia. See the article GALENIA.

SHERBORN, a market-town, twelve miles ſouth-weſt of York.

SHERBRO, a fort at the mouth of the river Sherbro, in Guinea, formerly in the poſſeſſion of the Engliſh.

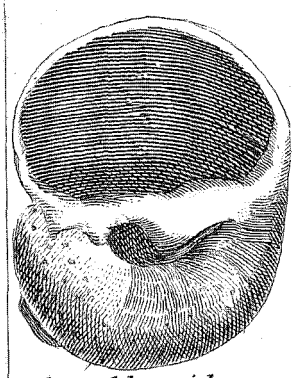
SHERENESS, a fort on the north-weſt part of the iſle of Sheppey, ſituated at the mouth of the river Medway, to defend its entrance.

SHERIFF, an officer in each county of England, nominated by the king, inveſted with a judicial and miniſterial power, and who takes place of every nobleman in the county, during the time of his office. His judicial authority conſiſts in hearing and determining cauſes in his county-court, and in keeping the peace of the county; he being by the common law the principal conſervator of the peace there; for which reaſon he is to aſſiſt the juſtices, and raiſe the poſſe comitatus when occaſion requires; and ſuch perſons, as on a hue and cry he ſhall apprehend upon ſuſpicion of felony, he is to commit to priſon; he may alſo impriſon any one who breaks the peace in his preſence. The miniſterial office of the ſheriff conſiſts in proclaiming ſtatutes, and making returns of writs for electing knights of the ſhire, *&c.* He collects the king's rents, ſeizes the profits of lands forfeited, and the goods of felons, levies the king's debts, fines, amercements, *&c.* and is accountable to the king for the profits of the county, on which account the ſum of 4000l. is ſet apart and annually allowed to the ſheriffs of the ſeveral counties of England, to help them to paſs their accounts, and to defray their expences at the aſſizes, *&c.* where no ſheriff is obliged to keep a table for the entertainment of any perſons but thoſe of his

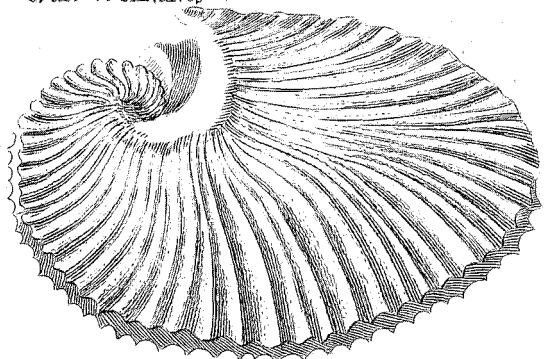
own

SHELLS

Order 1. Univalves

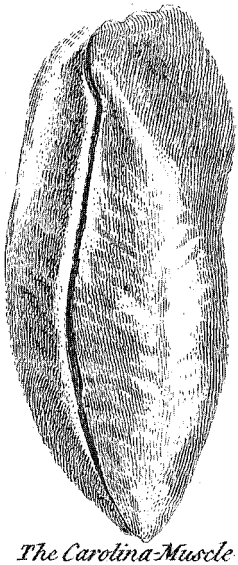


The Cochlea with a Semicircular Mouth

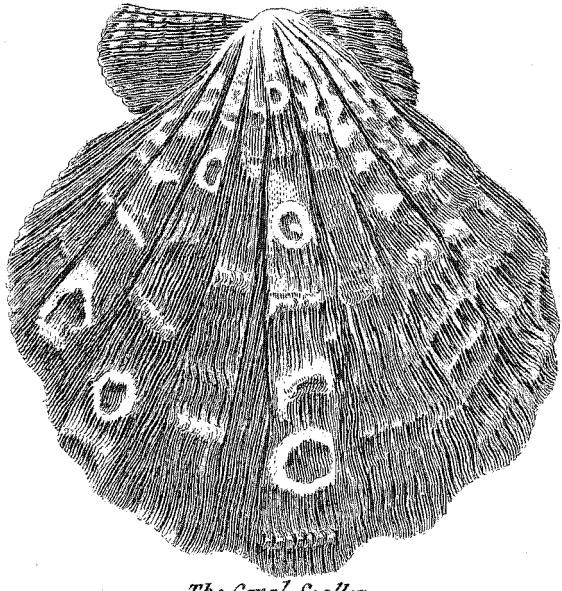


The Paper-Nautilus

Order 2. Bivalves



The Carolina-Muscle



The Coral-Scallop

Order 3. Multivalves

The Bluish Polliceps

T. Jefferys sculp.

own retinue; neither is he to have above forty ſervants in livery, or leſs than twenty attending him. It is alſo his office to execute the writs and proceſſes out of the king's court; and no proceſs is to be ſerved but by the ſheriff. He returns juries for trials, as well in civil as in criminal caſes, except where there is cauſe of challenge againſt him, in which caſe they are to be returned by the coroner. And, laſtly, the ſheriff is to ſee that criminals are executed, and the order of law obſerved in putting them to death.

A ſheriff has uſually under him an under-ſheriff, bailiffs, and a gaoler, for all of whom he is anſwerable. An under-ſheriff ought always to have his deputy in the courts of juſtice, in order to receive their commands, and give an account of buſineſs, *&c.* All returns made by the under ſheriff are in the name of the high-ſheriff; and for every default in the execution of his office, either by fraud or neglect, the high-ſheriff is amerceable in the exchequer. On the death of any ſheriff, the under-ſheriff ſhall officiate in his name, till another is appointed, and alſo be anſwerable, *&c.*

In London, the lord mayor and citizens elect their ſheriffs; and by a by-law of the city, if any perſon refuſe to take upon him the office, he is to pay 420 l. fine, unleſs he makes oath that he is not worth 10,000 l.

SHIELD, an antient weapon of defence, in the form of a light buckler, borne on the arm, to turn off lances, darts, *&c.*

SHIELD, in heraldry, the eſcutcheon or field on which the bearings of coats of arms are placed. See ESCUTCHEON.

SHILLING, an engliſh ſilver-coin. See the article COIN.

It is obſerved that there were no ſhillings or twelve-penny pieces in England till the year 1504, when they were firſt coined by Henry VIII.

SHINGLES, in building, ſmall pieces of wood, or quartered oaken boards, ſawn to a certain ſcantling, or, as is more uſual, cleft to about an inch thick at one end, and made like wedges, four or five inches broad, and eight or nine inches long.

Shingles are alſo uſed inſtead of tiles or ſlates, eſpecially for churches and ſteeples: however this covering is dear; yet where tiles are very ſcarce, and a light covering is required, it is preferable to thatch; and where they are made of good oak, cleft, and not ſawed, and well ſeaſoned in water and the ſun, they make a ſure, light, and durable covering.

The building is firſt to be covered all over with boards, and the ſhingles nailed upon them.

SHINGLES, in medicine, a kind of herpes. See the article HERPES.

SHIP, *navis*, a general name for all large veſſels with ſails, fit for navigation on the ſea; except galleys, which go with oars and ſmack-ſails. See NAVIGATION, NAVAL AFFAIRS, and NAVY.

A ſhip is undoubtedly the nobleſt machine that ever was invented; and conſiſts of ſo many parts, that it would require a whole volume to deſcribe it minutely. However, we ſhall endeavour to ſatisfy the reader the more fully on this head, as it is an article of the utmoſt importance, of which no gentleman ſhould be ignorant: and firſt to give an idea of the ſeveral parts and members of a ſhip, both external and internal, with their reſpective names in the ſea-language, in plate CCXLVII. is repreſented a ſhip of war of the firſt rate, with rigging, *&c.* at anchor; where A is the cat-head; B, the fore-chains; C, the main-chains; D, the mizzen-chains; E, the entring-port; F, the hawſe-holes; G, the poop-lanterns; H, the cheſs-tree; I, the head; K, the ſtern.

L, the bowſprit; 1, 2, yard and ſail; 3, gammoning; 4, horſe; 5, bob-ſtay; 6, ſprit-ſail ſheets; 7, pendants; 8, braces and pendants; 9, halliards; 10, lifts; 11, clew-lines; 12, ſprit-ſail horſes; 13, bunt-lines; 14, ſtanding lifts; 15, ſprit-ſail top; 16, flying jib-boom; 17, flying jib-ſtay and ſail; 18, halliards; 19, ſheets; 20, horſes.

M, the ſprit-ſail top-maſt; 21, ſhrouds; 22, 23, yard and ſail; 24, ſheet; 25, lifts; 26, braces and pendants; 27, cap; 28, jack-ſtaff; 29, truck; 30, jack-flag.

N, the fore-maſt; 31, runner and tackle; 32, 33, ſhrouds; 34, laniards; 35, ſtay and laniard; 36, preventer-ſtay and laniard; 37, woolding the maſt; 38, yard and ſail; 39, horſes; 40, top; 41, crowfoot; 42, jeers; 43, yard-tackles; 44, lifts; 45, braces and pendants; 46, ſheets; 47, fore-tacks; 48, bow-lines and bridles; 49, fore bunt-lines; 50, fore leech-lines; 51, fore top-rope; 52, puttock-ſhrouds.

O, the fore-top-maſt; 53, 54, ſhrouds and laniards; 55, yard and ſail; 56, ſtay and ſail; 57, runner; 58, back-

ſtays; 59, halliards; 60, lifts; 61, braces and pendants; 62, horſes; 63, clew-lines; 64, bow-lines and bridles; 65, reef-tackles; 66, ſheets; 67, bunt-lines; 68, croſs-trees; 69, cap.

P, the fore-top gallant-maſt; 70, 71, ſhrouds and laniards; 72, yard and ſail; 73, back-ſtays; 74, ſtay; 75, lifts; 76, clew-lines; 77, braces and pendants; 78, bow-lines and bridles; 79, flag-ſtaff; 80, truck; 81, flag-ſtaff-ſtay; 82, flag of lord high-admiral.

Q, the main-maſt; 83, 84, ſhrouds; 85, laniards; 86, runner and tackle; 87, pendant of the gornet; 88, guy of ditto. 89, ſail of ditto. 90, ſtay; 91, preventer-ſtay; 92, ſtay-tackle; 93, woolding the maſt; 94, jeers; 95, yard-tackles; 96, lifts; 97, braces and pendants; 98, horſes; 99, ſheets; 100, tacks; 101, bow-lines and bridles; 102, crow-foot; 103, top-rope; 104, top; 105, bunt-lines; 106, leech-lines; 107, yard and ſail.

R, the main-top-maſt; 108, 109, ſhrouds and laniards; 110, yard and ſail; 111, puttock-ſhrouds; 112, back-ſtays; 113, ſtay; 114, ſtay-ſail and ſtay and halliards; 115, runnets; 116, halliards; 117, lifts; 118, clew-lines; 119, braces and pendants; 120, horſes; 121, ſheets; 122, bow-lines and bridles; 123, bunt-lines; 124, reef-tackles; 125, croſs-trees; 126, cap.

S, the main-top gallant-maſt; 127, 128, ſhrouds and laniards; 129, yard and ſail; 130, back-ſtays; 131, ſtay; 132, ſtay-ſail and halliards; 133, lifts; 134, braces and pendants; 135, bow-lines and bridles; 136, clew-lines; 137, flag-ſtaff; 138, truck; 139, flag-ſtaff-ſtay; 140, flag-ſtandard.

T, the mizzen-maſt; 141, 142, ſhrouds and laniards; 143, pendants and burtons; 144, yard and ſail; 145, crow-foot; 146, ſheet; 147, pendant-lines; 148, peck-brails; 149, ſtay-ſail; 150, ſtay; 151, derric and ſpann; 152, top; 153, croſs jack-yard; 154, croſs jack-lifts; 155, croſs jack-braces; 156, croſs jack-ſlings.

V, the mizzen-top-maſt; 157, 158, ſhrouds and laniards; 159, yard and ſail; 160, back-ſtays; 161, ſtay; 162, halliards; 163, lifts; 164, braces and pendants; 165, bow-lines and bridles; 166, ſheets; 167, clew-lines; 168, ſtay-ſail; 169, croſs-trees; 170, cap; 171, flag-ſtaff; 172, flag-ſtaff-ſtay; 173, truck; 174, flag-union; 175, enſign-ſtaff; 176, truck; 177, enſign; 178, poop-ladder; 179, bower-cable.

Thus we have pointed out the external parts, maſts, rigging, &c. an account of all which may be ſeen under their reſpective articles MAST, HULL, ROPE, RUDDER, &c.

In plate CCXLVIII. is repreſented the ſection of a firſt rate ſhip of war, ſhewing the inſide thereof: where A is the head; containing, 1, the ſtem; 2, the knee of the head, or cut-water; 3, the lower and upper cheek; 4, the tail-board; 5, the figure; 6, the gratings; 7, the brackets; 8, the falſe ſtem; 9, the breaſt-hooks; 10, the hauſe-hole; 11, the bulk-head, forward; 12, the cat-head; 13, the cat-hook; 14, neceſſary ſeats; 15, the manger within board; 16, the bow-ſprit.

B, upon the fore-caſtle; 17, the gratings; 18, the partners of the fore-maſt; 19, the gun-wale; 20, the belfry; 21, the funnel for the ſmoak; 22, the gang-way going off the fore-caſtle; 23, the fore-caſtle guns.

C, in the fore-caſtle; 24, the door of the bulk-head, forward; 25, the officers cabbins; 26, the ſtair-caſe; 27, the fore-top-ſail-ſheet bits; 28, the beams; 29, the car-lines.

D, the middle-gun-deck forward; 30, the fore-jeer bits; 31, the oven and furnace of copper; 32, the captain's cook-room; 33, the ladder, or way up into the fore-caſtle.

E, the lower-gun-deck, forward; 34, the knees fore and aft; 35, the ſpirketings, or the firſt ſtreak next to each deck; the next under the beams being called clamps; 36, the beams of the middle gun-deck, fore and aft; 37, the car-lines of the middle gun-deck, fore and aft 38, the fore-bits; 39, the after or main-bits; 40, the hatchway to the gunner's and boatſwain's ſtore-rooms; 41, the jeer capſton.

F, the orlop; 42, 43, 44, the gunner's boatſwain's, and carpenter's ſtore-rooms; 45, the beams of the lower-gun-deck; 46, 47, the pillars and the riders, fore and aft; 48, the bulk-head of the ſtore-rooms.

G, the hold; 49, 50, 51, the foot-hook-rider, the floor-rider, and the ſtandirt, fore and aft; 52, the pillars; 53, the ſtep of the fore-maſt; 54, the keelſon, or falſe keel, and dead riſing; 55, the dead wood.

H, a-midſhips in the hold; 56, the floor-timbers; 57, the keel; 58, the well;

59,

59, the chain-pump; 60, the ſtep of the main-maſt; 61, 62, beams and car-lines of the orlop, fore and aft.

I, the orlop a-midſhips; 63, the cable-tire; 64, the main hatchway.

K, the lower gun-deck a-midſhips; 65, the ladder leading up to the middle gun-deck; 66, the lower tire or ports.

L, the middle gun-deck a-midſhips; 67, the middle tire-ports; 68, the entring-port; 69, the main jeer-bits; 70, twiſted pillars or ſtantions; 71, the capſton; 72, the gratings; 73, the ladder leading to the upper deck.

M, the upper gun-deck a-midſhips; 74, the main-top-ſail-ſheet bits; 75, the upper partners of the main-maſt; 76, the gallows on which ſpare top-maſts, *&c.* are laid; 77, the fore ſheet-blocks; 78, the rennets; 79, the gun-wale; 80, the upper gratings; 81, the drift-brackets; 82, the piſs-dale; 83, the capſton-pall.

N, abaft the main-maſt; 84, the gangway off the quarter-deck; 85, the bulk-head of the coach; 86, the ſtair-caſe down to the middle gun-deck; 87, the beams of the upper deck; 88, the gratings about the main-maſt; 89, the coach, or council-chamber; 90, the ſtair-caſe up to the quarter-deck.

O, the quarter-deck; 91, the beams; 92, the car-lines; 93, the partners of the mizzen-maſt; 94, the gangway up to the poop; 95, the bulk-head of the cuddy.

P, the poop: 96, the trumpeter's cabbin; 97, the tafferel.

Q, the captain-lieutenant's cabbin.

R, the cuddy, uſually divided for the maſter and ſecretary's officers.

S, the ſtate-room, out of which is made the bedchamber, and other conveniencies for the commander in chief; 98, the entrance into the gallery; 99, the bulk-head of the great cabbin; 100, the ſtern-lights and after-galleries.

T, the ward-room, allotted for the lieutenants and land-officers; 101, the lower gallery; 102, the ſteerage and bulk-head of the ward-room; 103, the whipſtaff, commanding the tillar; 104, the after-ſtair-caſe down to the lower gun-deck.

V, ſeveral officers cabbin abaft the main-maſt, where the ſoldiers generally keep guard.

W, the gun-room; 105, the tillar commanding the rudder; 106, the rudder: 107, the ſtern-poſt; 108, the tillar-tranſom; 109, the ſeveral tranſoms, *viz.* 1, 2, 3, 4, 5; 110, the gun-room-ports, or ſtern-chaſe; 111, the bread-room-ſcuttle, out of the gun-room; 112, the main-capſton; 113, the pall of the capſton; 114, the partners; 115, the bulk-head of the bread-room.

X, the bread-room; Y, the ſteward's room, where all proviſions are weighed and ſerved out; Z, the cock-pit, where are ſubdiviſions for the purſer, the ſurgeon, and his mates.

AA, the platform, or orlop, where proviſion is made for the wounded in time of ſervice; 116, the hold abaft the main-maſt; 117, the ſtep of the mizen-maſt; 118, the keelſon, or falſe keel; 119, the dead-wood, or riſing.

Different kinds of SHIPS. All ſhips at firſt were of the ſame form, whatever uſes they were deſigned for; but the various ends of navigation, ſome of which were better anſwered by one form, ſome by another, ſoon gave occaſion to build and fit out ſhips, not only different in bigneſs, but alſo in their conſtruction and rigging: and as trade gave occaſion to the fitting out large fleets of different kinds of merchant-ſhips; ſo ſhips of war became neceſſary to preſerve them to their juſt propietors. Theſe laſt, or ſhips of war, have three maſts and a bow-ſprit, and are ſailed with ſquare ſails; the other parts being as deſcribed above, and repreſented in plate CCXLVII.

But beſides theſe, there are other forms: as, 1. The bilander, (plate CCXLVIII. fig. 2.) which has rigging and ſails, not unlike a hoy only broader and flatter: bilanders are ſeldom above twenty-four tuns, and can lie nearer the wind than a veſſel with croſs-ſails can do. 2. Bomb-veſſels (*ib.* fig. 3.) have ſometimes three maſts, and ſquare ſails, as repreſented; but they are alſo frequently ketch-faſhion, with one maſt and a mizen. 3. Brigantines (*ibid.* fig. 4.) are now diſuſed, but had two maſts, and ſquare ſails. 4. Hagboats (*ibid.* fig. 5.) are maſted and ſailed ſhip-faſhion, but are built in the form of the dutch fly-boats. 5. Hoys (*ib.* fig. 6.) are fitted with one maſt and a ſprit-ſail; whoſe yards ſtand fore and aft like a mizen, ſo that it can lie near the wind. 6. Hulks (*ib.* fig. 7.) are generally old ſhips cut down to the gun-deck, and fitted with a large wheel, for men to go in when careening: it has alſo ſeveral capſtons fixed on its deck, for ſetting ſhip's maſts. 7. Ketches (*ibid.* fig. 8.) are fitted with two maſts, and their main-ſail and top-ſail ſtand

ſquare, as thoſe of ſhips do; but their fore-ſail and jibbs, as thoſe of hoys do. 8. Lighters (*ib.* fig. 9.) are veſſels made uſe of for laying down or ſhifting the moorings, for bringing aſhore or carrying on board ſhips cables, anchors, *&c.* 9. Pinks (*ibid.* fig. 10.) ſail with three maſts, ſhip-faſhion, but are round ſterned, with a ſmall projection above the rudder. 10. Punts (*ib.* fig. 11.) are built ſquare, and uſed about the docks for fetching clay, and other ſervices as the maſter-ſhipwright wants them for. 11. Shallop (*ib.* fig. 12.) is a ſmall light veſſel, with only a ſmall main and fore-maſt, and lugg-ſails, to haul up and let down on occaſion. 12. Sloops (*ibid.* fig. 13.) have only one maſt, with ſhoulder of mutton, ſquare, lugg, and ſmack ſails. 13. Smacks (*ibid.* fig. 14.) are tranſporting-veſſels, with one maſt, and an half ſprit-ſail. 14. Yachts (*ibid.* fig. 15.) have only one maſt, with an half ſprit or ſmack-ſail, and ſometimes ketch-faſhion. See the articles BILANDER, BOMB-VESSEL, BRIGANTINE, *&c.*

Conſtruction of SHIPS. Naval architecture may be divided into three principal parts: 1. To give the ſhip ſuch a figure and proportion, as may ſuit the ſervice ſhe is deſigned for. 2. To find the true form of all the pieces of timber that ſhall be neceſſary to compoſe ſuch a ſolid. 3. To make proper accommodations for guns, ammunition, proviſions, and apartments for all the officers, and likewiſe room for the cargo.

As to the firſt part, the length of the keel, greateſt breadth, depth in the hold, height between decks and in the waſte, and ſometimes the height and breadth of the wing-tranſom, in ſhips for the merchants ſervice, are agreed on by contract; and from theſe dimenſions the builder forms a draught ſuitable to the trade the ſhip is deſigned for. The firſt thing that is generally done, is to lay down the keel, the ſtem, and ſtern-poſt upon the ſheer-plane, or plane ſuppoſed to paſs through the middle line of the keel, ſtem, and ſtern-poſt, cutting the ſhip in two halves lengthwiſe. They next determine the proper ſtation of the midſhip-timber, where a perpendicular is erected; and is generally about two thirds of the keel before the ſtern-poſt: on this line the given depth of the hold is ſet off, from the upper-ſide of the keel; to obtain which point, the thickneſs of all the timber and plank muſt be added to the height agreed on. This being fixed, will enable us to determine the upper-height of the extreme or greateſt breadth of the ſhip; which, ſometimes, is that very point; and from the ſame place the lower height of the breadth muſt be determined. The two main heights of the breadth-lines, which nearly unite abaft and afore, are next determined. The heighth of the breadth-line of the top-timber is next formed; being limited in the midſhip by contract, but afore and aft only by the judgment and fancy of the artiſt. If a ſquare ſtern is deſigned, the breadth at the wing-tranſom is limited, being generally about two thirds of the greateſt breadth. The artiſt next fixes the breadth of the top-timber, and then deſcribes the two half-breadth lines. After theſe are formed, the places where the ſeveral timbers are fixed: and for forming the midſhip-frame, radii are aſſumed at pleaſure, till the ſweeps are made to pleaſe the fancy and judgment of the artiſt. When this midſhip-frame is formed, a pattern or mould is made to fit exactly to the curve, and the dead-riſing or water-line; and by this and a hollow mould, all the timbers are formed, as far as the riſing-line, which is parallel to the lower height of the breadth-line.

We come next to conſider the upper-works, or all that is above water, called the dead-work: and here the ſhip muſt be narrower, by which means ſhe will ſtrain leſs by working the guns, and the main-ſail will be eaſier trimmed, as the ſhrouds ſpread leſs than they would otherwiſe do. But though theſe advantages are gained by narrowing a ſhip above water, yet great care muſt be taken not to narrow her too much, leſt there ſhould not be ſufficient room upon the upper deck for the guns to recoil. The ſecurity of the maſts ſhould likewiſe be conſidered, which requires ſufficient breadth to ſpread the ſhrouds: though this may be aſſiſted by enlarging the breadth of the channels.

Principal qualities belonging to SHIPS. A ſhip of war ſhould carry her lower tire of guns four or five feet above water; a ſhip for the merchants ſervice ſhould ſtow the cargo well: and both of them ſhould be made to go well, carry a good ſail, ſteer well, and lie-to eaſily in the ſea. 1. To make a ſhip carry a good ſail, Mr. Du Hamel recommends a flat floor timber, and ſomewhat long, or the lower futtock pretty round; alſo a ſtraight upper futtock, and the top-timber to throw the breadth out aloft; and, at any rate, to carry her main-

main-breadth as high as the lower-deck; for if the rigging be well adapted to ſuch a body, and the upper-works heightened as much as poſſible, ſo as all to concur to lower the center of gravity, there will be no room to doubt of her carrying a good ſail. 2. To make a ſhip ſteer well, and anſwer the leaſt motion of the helm, the faſhion-pieces ſhould be well formed, the tuck carried pretty high, and the midſhip-frame carried pretty forward; alſo there ſhould be a conſiderable greater draught of water abaft than afore, a great rake forward, and none abaft, and a ſnug quarter-deck and fore-caſtle: all theſe will make a ſhip ſteer well. But to make her feel the leaſt motion of her helm, it will be neceſſary to regard her maſts; for a ſhip that goes well, will certainly ſteer well. 3. To make a ſhip carry her guns well out of the water, is effected by a long floor-timber, and not of great riſing, a very full midſhip-frame, and low tuck, with light upper-works. 4. To make a ſhip go ſmoothly through the water, without pitching hard, her keel ſhould be long, her floor long and not riſing high afore or aft; the area or ſpace contained in the fore-body ſhould alſo be duly proportioned to that of the after-body, according to the reſpective weights they are to carry. 5. To make a ſhip keep a good wind, ſhe ſhould have a good length by the keel, not too broad, but pretty deep in the hold; which will make her floor-timber ſhort, and riſing great. As ſuch a ſhip will meet with great reſiſtance in the water going over the broad-ſide, and but little when going a-head, ſhe will not fall much to the leeward. Now ſome ſhip-builders imagine, that it is impoſſible to make a ſhip carry her guns well, carry a good ſail, and be a prime ſailer at the ſame time, becauſe it requires a very full bottom to gain the two firſt qualities, and a ſharp-bottomed ſhip beſt anſwers the latter: but when it is conſidered, that a full ſhip will carry a great deal more ſail than a ſharp one, a good artiſt may ſo form the body as to have all theſe three good qualities united, and likewiſe ſteer well: for which purpoſe, Mr. Du Hamel recommends ſomewhat more in length than has been commonly practiſed.

SHIP *of pleaſure, thalamegus*, in antiquity. See the article THALAMEGUS.

SHIPTON, a market-town, twenty-four miles ſouth-eaſt of Worceſter.

SHIRE, in geography, ſignifies the ſame as county; being originally derived from the ſaxon ſcipan, *to divide*. See the articles COUNTY, SHERIFF, and LORD LIEUTENANT.

SHIVERS, or SHEEVERS, in the ſea-language, names given to the little rollers or round wheels of pulleys. See the article PULLEY.

SHOAD, among miners, denotes a train of metalline ſtones, ſerving to direct them in the diſcovery of mines. See MINE.

SHOAL, in the ſea-language, denotes a place where the water is ſhallow.

SHOAR, or SHORE. See SHORE.

SHOE, *calceus*, a covering for the foot, uſually made of leather, by the company of cordwainers. See CORDWAINERS.

Horſe-SHOES. See the article HORSE.

SHOE *for an anchor*, in a ſhip, the place for the anchor to reſt, and fitted to receive the ſtock, *&c.* ſo as to prevent the ſheets, tacks, and other running-rigging, from galling, or being entangled with the flooks.

SHOOTING. See the articles GUNNERY and PROJECTILE.

SHORE, or SHOAR, a place waſhed by the ſea, or by ſome large river.

Count Marſigli divides the ſea-ſhore into three portions; the firſt of which is that tract of land which the ſea juſt reaches in ſtorms and high tides, but which it never covers; the ſecond part of the ſhore, is that which is covered in high tides and ſtorms, but is dry at other times; and the third is the deſcent from this, which is always covered with water. See SEA.

The firſt part is only a continuation of the continent, and ſuffers no alteration from the neighbourhood of the ſea, except that it is rendered fit for the growth of ſome plants, and wholly unfit for that of others, by the ſaline ſteams and impregnations: and it is ſcarce to be conceived by any, but thoſe who have obſerved it, how far on land the effects of the ſea reach, ſo as to make the earth proper for plants, which will not grow without this influence; there being ſeveral plants frequently found on high hills, and dry places, at three, four, and more miles from the ſea, which yet would not grow, unleſs in the neighbourhood of it, nor will ever be found elſewhere.

The ſecond part or portion of the ſhore is much more affected by the ſea than the former, being frequently waſhed and beaten by it. Its productions are rendered ſalt by the water, and is covered with ſand, or with the fragments of ſhells in form of ſand, and in ſome places with a tar-

a tartarous matter depoſited from the water; the colour of this whole extent of ground is uſually duſky and dull, eſpecially where there are rocks and ſtones, and theſe covered with a ſlimy matter.

The third part of the ſhore is more affected by the ſea than either of the others, and is covered with an uniform cruſt of the true nature of the bottom of the ſea, except that plants and animals have their reſidence in it; and the decayed parts of theſe alter it a little.

SHOREHAM, a borough and port-town of Suſſex, twenty-five miles eaſt of Chicheſter.

It ſends two members to parliament.

SHORT-SIGHTEDNESS, *myopia*, in medicine. See the article MYOPIA.

SHOT, a denomination given to all ſorts of balls for fire-arms; thoſe for cannon being of iron, and thoſe for guns, piſtols, *&c.* of lead.

For the method of granulating ſhot for uſe of fowlers, ſee GRANULATION.

Trundle-SHOT, an iron-ſhot, about ſeventeen inches long, and ſharp-pointed at both ends, with a ball of lead faſtened upon it, about a hand-breadth from each end.

SHOTTEN, or *Blood*-SHOTTEN. See the article BLOOD.

SHOVELER, in ornithology, a ſpecies of the anas, with the extremity of the beak broad and round, and its ungues bent. See the article ANAS.

SHOULDER-BONE, *humerus*, in anatomy. See the article HUMERUS.

SHOULDER-BLADE, *ſcapula*. See SCAPULA.

SHOULDER-PITCHED, among farriers, is ſaid of a horſe whoſe ſhoulder is diſplaced, which may be remedied by ſwimming the horſe a dozen times up and down in deep water.

SHOULDER-SPLAIT, is when a horſe's ſhoulder is parted from the breaſt.

SHOULDERING PIECE, among builders, the ſame with a bracket. See the article BRACKET.

SHOWER, in meteorology, a cloud reſolved into rain. See the article RAIN.

SHREW-MOUSE, or *Hardy*-SHREW, *ſorex*, or *mus araneus*, in zoology, a genus of quadrupeds, of the order of the glires; the upper fore-teeth of which are biſid, and the lower ones ſerrated: the upper canine teeth are very ſmall, and four in number.

The ſhrew-mouſe is an extremely ſingular little animal, which greatly reſembles the common mouſe, but is ſomewhat ſmaller.

SHREWSBURY, the county-town of Shropſhire, ſituated on the river Severn; weſt lon. 2° 46′, north lat. 52° 46′.

It ſends two members to parliament.

SHRIMP, in ichthyology, the engliſh name of two different ſpecies of the ſquilla, *viz.* the common ſhrimp, and the ſmooth-noſed ſhrimp. See SQUILLA.

The common ſhrimp is the long-tailed ſquilla, with the ſnout ſerrated above and tridentated below; the body is oblong and rounded above the beak or ſnout; which diſtinguiſhes it from all the other ſpecies: it is long, of a lanceolated figure, ſharp-pointed, and has eight denticulations above, and three below. The ſmooth-noſed ſhrimp, or long-tailed ſquilla, with a ſmooth ſnout, grows to the ſame ſize with the common ſhrimp; however, the body is thick, and the ſnout is very ſhort, without the ſpines or denticulations of the other.

SHRINE, in eccleſiaſtical hiſtory, a caſe or box, to hold the relics of ſome ſaint. See the articles RELICS and SAINT.

SHRITE, in ornithology, the ſame with the miſſel-bird. See MISSEL.

SHROPSHIRE, a county of England, bounded by Cheſhire on the north, by Staffordſhire on the eaſt, by Herefordſhire on the ſouth, and by Montgomeryſhire on the weſt.

SHROUDS, or SHROWDS. See the article SHROWDS.

SHROVE-TUESDAY, is the Tueſday after quinquageſima Sunday, or the day immediately preceding the firſt of lent; being ſo called from the ſaxon word ſhrive, which ſignifies *to confeſs*, as having been employed by the people, in time of popery, in confeſſing their ſins, in order to receive the ſacrament, and thereby qualify themſelves for a more religious obſervation of lent. See the article LENT.

In proceſs of time, this cuſtom was changed into that of mutual invitations, in order to take leave of fleſh-meat and other dainties; and this made way for ſports and other merriments, which at preſent make up the whole buſineſs of the carnival, or ſeaſon immediately preceding lent. See the article CARNIVAL.

SHROWDING *of trees*, the cutting or lopping off their top branches; which is practiſed only on trees not fit for timber, and deſigned to yield a preſent advantage, and ſerve for fuel.

Trees ſhould be three or four years old before they are ſhrowded, which ſhould be done

done in winter for the harder ſorts of wood, and in ſpring for the ſofter kinds, taking care to cut the remaining ſtump aſlope and ſmooth.

SHROWDS, or SHROUDS, in a ſhip, are the great ropes which come down both ſides of the maſts, and are faſtened below to the chains on the ſhip's ſide, and aloft to the top of the maſt; being parcelled and ſerved, in order to prevent the maſt's galling them. The top-maſt-ſhrowds are faſtened to the puttock-plates, by dead-eyes and laniards, as the others are. See the article SHIP.

Some of the terms relating to the ſhrowds are: eaſe the ſhrowds; that is, ſlacken them: and, ſet up the ſhrowds; that is, ſet them ſtiffer.

SHRUB, *frutex*, among naturaliſts, denotes a dwarf-tree, or a woody plant leſs than a tree: ſuch are holly, box, privet, *&c.*

SHUTTLE, in the manufactures, an inſtrument much uſed by weavers, in the middle of which is an eye, or cavity, wherein is incloſed the ſpoul with the woof. See the article WEAVING.

SI, in muſic, a ſeventh note or ſound, added by Le Maire to the ſix antient notes invented by Guido Aretine, *viz. ut, re, mi, fa, ſol, la, ſi.* See the articles GAMUT, SCALE, and SOLFAING.

SIAM, the capital of a kingdom of the ſame name, in the farther peninſula of India: eaſt lon. 101°, north lat. 14°.

SIBA, a province of the hither India, ſituated between Tibet on the eaſt, and Lahor on the weſt.

SIBALDIA, in botany, a genus of the *pentandria-pentagynia* claſs of plants, the flower of which conſiſts of five oval petals; and its ſeeds, which are five in number, are contained in the bottom of the cup, which cloſes for that purpoſe.

SIBERIA, or ASIATIC RUSSIA, the moſt northern country of Aſia, ſituated between 60° and 130° eaſt longitude, and between 47° and 72° north latitude; being upwards of two thouſand miles in length from eaſt to weſt, and one thouſand five hundred miles in breadth from north to ſouth. We include the Calmuc Tartars within the limits of Siberia, as they acknowledge themſelves ſubject to the empire of Ruſſia.

SIBIT, a town of Arabia Fœlix, ſituated in eaſt lon. 45°, north lat. 15°

SIBYLS, *ſibyllæ*, in pagan antiquity, certain women ſaid to have been endowed with a prophetic ſpirit, and to have delivered oracles, fore-ſhowing the fates and revolutions of kingdoms, *&c.* The moſt eminent of the ten ſibyls mentioned by antient writers, was ſhe whom the Romans called the cumæan or erythræan ſibyl, from her being born at Erythræ in Ionia, and removing from thence to Cumæ in Italy, where ſhe delivered all her oracles from a cave, dug out of the main rock, according to Virgil, Æn. III. 441, *&c.*

There is ſtill preſerved, in eight books of greek verſes, a collection of verſes, pretended to have been delivered by the ſibyls; but the generality of critics look upon it as ſpurious: and it is the opinion of Prideaux, that the ſtory of the three books of the ſibyls, ſold to Tarquin, was a ſtate-trick or fetch of politics.

SICE-ACE, a game with dice and tables, whereat five may play; each having ſix men, and the laſt out loſing.

At this game, they load one another with aces; ſixes bear away; and doublets drinks, and throws again.

SICHEM, or ZICHEM, a town of Brabant, eighteen miles eaſt of Mechlin.

SICILIAN, in muſic, a kind of air or dance, in triple time, and played ſlow, notwithſtanding it is marked the ſame as a jigg.

SICILY, the largeſt of all the italian iſlands, anciently called Trinacria, from its triangular figure: it is ſituated between 12° and 16° eaſt longit. and between 37° and 39° north latitude: being about one hundred and ſeventy miles long, and one hundred broad.

It is ſeparated from Calabria, in Italy, by the ſtreights of Meſſina, which, in the narroweſt part, is not ſeven miles over.

SICKNESS, *Falling*-SICKNESS, *Green*-SICKNESS, *&c.* See the articles DISEASE, EPILEPSY, CHLOROSIS, *&c.*

SICUT ALIAS, in law, another writ iſſued out like the former, where the firſt was not executed.

SICYANIA, or GOURD-WORM, in natural hiſtory, a genus of the apteria order of inſects, being of an oblong form, flat on the belly, and rounded on the back; the ſkin is ſoft; and the mouth large, horizontal, and emarginated, or dented in the middle. It grows to two thirds of an inch in length, though more uſually it is not half that ſize; its breadth is nearly two thirds of its length. See the article APTERIA.

SICYOS, or SICYOIDES, in botany, a genus of the *monœcia-ſyngeneſia* claſs of plants, the corolla of which is formed of a ſingle campanulated petal, divided into

five

five ſegments; and its fruit is a berry, containing only a ſingle ſeed.

Dillenius calls this plant bryonoides.

SIDA, in botany, a genus of the *monadelphia-polyandria* claſs of plants, with a pentapetalous flower: the fruit is a roundiſh capſule, terminating in a point, and compoſed of ſeveral horns, which finally ſeparating, tear the complex veſſel to pieces; the ſeeds are roundiſh and pointed, the one ſide being convex, and the other of an angular figure.

This genus comprehends the malvinda and abutilon of authors. See the article ABUTILON.

SIDA is alſo uſed for the althæa, or marſh-mallow. See the article ALTHÆA.

SIDE, *latus*, the half of any thing, as an animal, a ſhip, *&c.* The ſides of an animal are diſtinguiſhed into the right and left ſide; but thoſe of a ſhip, into the ſtarboard and larboard ſide. See RIGHT, LEFT, STARBOARD, *&c.*

In geometry, the ſides of a rectilinear figure are the lines which form its periphery. See FIGURE and PERIPHERY.

SIDE *of a power*, the ſame with its root. See the article ROOT.

SIDE-LAYS, among hunters, dogs that are let ſlip at a deer, as he paſſes.

SIDES-MEN, or SYNOD'S MEN, perſons who, in large pariſhes, are appointed to aſſiſt the church-wardens, in their enquiry and preſentments of ſuch offenders to the ordinary, as are puniſhable in the ſpiritual court.

SIDEN, a port-town of Arabia, ſituated on the eaſtern ſhore of the Red ſea, in eaſt lon. 42° 15′, and north lat. 21° 20′.

SIDERATION, a term uſed for a ſphacelus or mortification, See SPHACELUS. Some alſo uſe the term ſideration for the blaſting or blighting of trees. See the articles BLIGHT and TREE.

SIDEREAL YEAR. See YEAR.

SIDERITES, in natural hiſtory, the ſame with the magnet. See MAGNET.

SIDERITIS, IRON-WORT, in botany, a genus of the *didynamia-gymnoſpermia* claſs of plants, with a monopetalous, labiated, and ringent flower; the ſeeds are four in number, and contained in the cup, which ſerves inſtead of a capſule; add to this, that the flowers grow in circles round the ſtalks, at the joinings of the leaves. See plate CCL. fig. 4.

SIDEROXYLUM, in botany, a genus of the *pentandria-monogynia* claſs of plants, the flower of which conſiſts of a ſingle petal, divided into five roundiſh, erect, and concave ſegments; the fruit is a roundiſh berry, with two cells, in which are contained four ſeeds.

SIDMOUTH, a port-town of Devonſhire, ſituated on a bay of the Engliſh channel, ten miles ſouth-eaſt of Exeter.

SIDON, or SAYD, a port-town of Paleſtine, in aſiatic Turky, ſeventy miles north of Jeruſalem. It is ſtill a place of ſome conſideration, being the reſidence of of a turkiſh baſhaw.

SIDRA, an iſland of the Archipelago, ſituated at the entrance of the gulph of Napoli.

SIEGE, in the art of war, the encampment of an army before a fortified place, with a deſign to take it.

The method of encamping is very different in a ſiege, from that obſerved on a march; as in the former the army environs the place, without cannon-ſhot, that nothing may enter. If the place be ſituated on a river, a detachment is ſent to the other ſide, and bridges of communication made, both above and below the town. The army alſo encamp with their backs to the town, with the battalions and ſquadrons interlined: and having taken poſſeſſion of all the heights, whence the enemy may be annoyed, the engineers trace the lines of circumvallation and contravallation; every regiment working at the place appointed them. See the articles CIRCUMVALLATION and CONTRAVALLATION.

When the general has diſpoſed his guards, as well towards the place as towards the country, and eſtabliſhed the lieutenant-generals to command in the particular quarters, he goes with the engineers to view the place, and orders the attack in the place judged the weakeſt. See the article APPROACH.

To form a ſiege, there muſt be an army ſufficient to furniſh five or ſix reliefs for the trenches, pioneers, guards, *&c.* alſo artillery, and magazines furniſhed with a ſufficient quantity of ammunition and proviſions; and an hoſpital, for taking care of the wounded.

To raiſe a ſiege, is to give over attacking a place; ordering the works and poſts before it to be levelled.

SIEGEN, a city of Germany, thirty miles north of Naſſau.

SIEGENBERG, a town of Weſtphalia, fifteen miles ſouth-eaſt of Cologn.

SIENNA, a city of Italy, in the dutchy of Tuſcany, ſituated thirty-ſixs mile ſouth of Florence.

SIERRA LEON, a river of Guinea, which falls into the Atlantic ocean, in weſt lon. 14°, and north lat. 7°

SIEUR, a title of reſpect among the French, like *maſter* among us: it is much uſed by the lawyers, as alſo by ſuperiors in their letters to inferiors.

SIGAN, a town of China, in the province of Xenſi: eaſt longit. 108°. and north lat. 34°.

SIGESBECKIA, in botany, a plant of the *ſyngeneſia-polygamia-ſuperflua* claſs, with a compound radiated flower, and tubuloſe hermaphrodite corollulæ on the diſc; the receptacle of the ſeeds is paleaceous, and they have no down.

SIGETH, a town of lower Hungary, ſituated ſeventy-three miles ſouth-weſt of Buda, and ſubject to the houſe of Auſtria.

SIGHT, or VISION, in optics. See the article EYE and VISION.

SIGHTS *of a quadrant, &c.* thin pieces of braſs, raiſed perpendicularly on its ſide, or on the index of a theodolite, circumferentor, *&c.* They have each an aperture, or ſlit, up the middle, through which the viſual rays paſs to the eye, and diſtant objects are ſeen. See the articles QUADRANT, THEODOLITE, *&c.*

SIGILLATA TERRA, a kind of bole, called alſo lemnian earth. See the articles BOLE and LEMNOS.

SIGILLUM, a SEAL. See SEAL.

SIGISTAN, the capital of a province of the ſame name, in Perſia: eaſt lon. 62°. and north lat. 31°.

SIGN, *ſignum*, in general, the mark or character of ſomething abſent or inviſible. See the article CHARACTER.

Among phyſicians, the term ſign denotes ſome appearance in the human body, which ſerves to indicate or point out the condition of the patient, with regard to health or diſeaſes. See INDICATION, DISEASE, *&c.*

SIGN, in aſtronomy, a conſtellation containing a twelfth part of the zodiac, or 30°. See the article ZODIAC.

The names of the ſigns, in the order wherein they follow each other, are aries, taurus, gemini, cancer, leo, virgo, libra, ſcorpio, ſagittarius, capricornus, aquarius, piſces. See the articles ARIES, TAURUS, GEMINI, *&c.*

The three firſt of theſe ſigns are called the vernal, or ſpring-ſigns; the next three, cancer, leo, virgo, the æſtival, or ſummer-ſigns; libra, ſcorpio, and ſagittarius, the autumnal-ſigns; and capricornus, aquarius, piſces, the brumal, or winter-ſigns. The vernal and æſtival ſigns are alſo called the northern, and the autumnal and brumal the ſouthern ſigns.

SIGN-MANUAL, in law, is uſed to ſignify any bill, or writing, ſigned by the king's own hand.

SIGNALS, certain ſigns agreed upon, for ſuddenly conveying intelligence to places, to which the voice cannot reach. Thus, in ſome countries fires are lighted upon the hills, at the approach of danger: and at the beginning of a battle or an attack, ſignals are uſually made with drums and trumpets. At ſea they are given by firing cannon, or muſquets; by lights, flags, ſails, *&c.*

Signals at ſea are made by the admiral or commander in chief of a ſquadron, either in the day, or by night, whether for ſailing, fighting, or the better ſecurity of the merchant-ſhips under their convoy: theſe are very numerous and important, being all appointed and determined by the lords of the admiralty, and communicated in the inſtructions ſent to the commander of every ſhip of the fleet or ſquadron, before their putting to ſea. Some of the principal of which are as follow: when a commander in chief would have them unmoor, he looſes his main-top-ſail, and fires a gun, which, in the royal navy, is to be anſwered by every flag-ſhip, and every ſhip is to get under ſail as ſoon as ſhe can. When, in bad weather, he would have them wear, and bring to the other tack, he hoiſts a pendant on the enſign-ſtaff, and fires a gun: then the leward-moſt and ſtern-moſt ſhips are to wear firſt, and bring on the other tack, and lie-by, or go on with an eaſy ſail, till he comes a head. When any ſhip diſcovers land, he is to hoiſt his jack and enſign, and keep it abroad till the admiral anſwer him by hoiſting his, on ſight of which he is to haul down his enſign. If any diſcovers danger, he is to tack and bear up from it, and to hang his jack abroad from the main-top-maſt croſs-trees, and to fire two guns: but if he ſhould ſtrike or ſtick faſt, then, beſides the ſame ſignal with his jack, he is to keep firing, till he ſees all the fleet obſerve him, and endeavour to avoid the danger. When the admiral would have the vice-admiral to ſend out ſhips to chace, he hoiſts a flag ſtriped white and red on the flag-ſtaff at the fore-top-maſt-head, and fires a gun: but if he would have

the rear-admiral do ſo, he hoiſts the ſame ſignal on the flag ſtaff at the mizen-top-maſt head, and fires a gun. When he would have them give over chace, he hoiſts a white flag on his flag-ſtaff at the fore-top-maſt-head, and fires a gun; which ſignal is alſo to be made by that flag ſhip which is neareſt the ſhip that gives chace, till the chacing ſhip ſees the ſignal. When the admiral would have the fleet prepare to anchor, he hoiſts an enſign ſtriped red, blue, and white, on the enſign-ſtaff, and fires a gun; and every flag-ſhip makes the ſame ſignal.

Beſides theſe, there are many other ſignals uſed by day; and different ſignals, upon theſe and other occaſions, uſed by night: and others alſo when a fleet fails in a fog; all of which are to be found in the Book of Signals.

The ſignals for managing a ſea-fight are alſo very numerous, the principal of which are as follow: when the admiral would have the fleet form a line of battle, one ſhip a-head of another, he hoiſts an union-flag at the mizen-peek, and fires a gun; and every flag-ſhip does the like. But when they are to form a line of battle one a-breaſt of another, he hoiſts a pendant with the union-flag, *&c.* When he would have the admiral of the white, or he that commands in the ſecond poſt, to tack, and endeavour to gain the wind of the enemy, he ſpreads a white flag under the flag at the main-top-maſt-head, and fires a gun: and when he would have the admiral of the blue do ſo, he does the ſame with the blue flag. If he would have the vice-admiral of the red do ſo, he ſpreads a red flag from the cap, on the main-top-maſt-head downward on the back-ſtay; if the vice-admiral of the blue, he ſpreads a blue flag, and fires a gun: if he would have the rear-admiral of the red do ſo, he hoiſts a red flag at the flag-ſtaff at the mizen-top-maſt-head; if the rear-admiral of the white, a white flag; if the rear-admiral of the blue, a blue flag, and under it a pendant of the ſame colour, with a gun. If he would have him that commands in the ſecond poſt of his ſquadron, to make more ſail, he hoiſts a white flag on the enſign ſtaff; but if he that commands in the third poſt be to do ſo, he hoiſts a blue flag, and fires a gun; and all the flag-ſhips muſt make the ſame ſignal. Whenever he hoiſts a red flag on the flag ſtaff at the fore-top-maſt-head, and fires a gun, every ſhip in the fleet muſt uſe their utmoſt endeavour to engage the enemy in the order preſcribed. When he hoiſts a white flag on his mizen-peek, and fires a gun, all the ſmall frigates of his ſquadron, that are not of the line of battle, are to come under the ſtern. If the fleet be ſailing by a wind in the line of battle, and the admiral would have them brace their head-ſails to the maſt, he hoiſts up a yellow flag on the flag-ſtaff at the mizen-top-maſt head, and fires a gun, which the flag-ſhips are to anſwer, and then the ſhips in the rear are to brace firſt. After this, if he would have them fall their head-ſails, and ſtand on, he hoiſts a yellow flag on the flag-ſtaff of the fore-top-maſt-head, and fires a gun, which the flag-ſhips muſt anſwer; and then the ſhips in the van muſt fall firſt, and ſtand on. If, when this ſignal is made, the red flag at the fore-top-maſt-head be abroad, he ſpreads the yellow flag under the red flag. If the fleets being near one another, the admiral would have all the ſhips to tack together, the ſooner to lie in a poſture to engage the enemy, he hoiſts an union-flag on the flag-ſtaves at the fore and mizen-top-maſt-heads, and fires a gun; and all the flag-ſhips are to do the ſame. The fleet being in a line of battle, if he would have the ſhip that leads the van, hoiſt, lower, ſet, or hawl-up any of his ſails, he ſpreads a yellow flag under that at his main-top-maſt-head, and fires a gun; which ſignal the flag-ſhips are to anſwer: and the admiral will hoiſt, lower, ſet, or hawl-up the ſails which he would have the ſhips that lead the van do; which is to be anſwered by the flag-ſhips of the fleet. When the enemies run, and he would have the whole fleet follow them, he makes all the ſail he can after them himſelf, takes down the ſignal for the line of battle, and fires two guns out of his fore-chaſe, which the flag-ſhips anſwer; and then every ſhip is to endeavour to come up with, and board the enemy. When he would have the chaſe given over, he hoiſts a white flag at the fore-top-maſt-head, and fires a gun. If he would have the red ſquadron draw into a line of battle, one a-breaſt of another, he puts abroad a flag ſtriped red and white on the flag-ſtaff at the main-top-maſt-head, with a pendant under it, and fires a gun: if the white or ſecond ſquadron is to do ſo, the flag is ſtriped red, white, and blue: if the blue or third ſquadron is to do ſo, the flag is a genoeſe enſign and pendant: but if they are to draw into a line of battle one a-

head of another, the ſame ſignals are made without a pendant. If they are to draw into the line of battle one a-ſtern of another, with a large wind, and he would have the leaders go with the ſtarboard-tacks aboard by the wind, he hoiſts a red and white flag at the mizen-peek, and fires a gun: but if they ſhould go by the larboard-tacks aboard the wind, he hoiſts a genoeſe flag at the ſame place: which ſignals, like others, muſt be anſwered by the flag-ſhips.

SIGNATURE, a ſigning of a perſon's name at the bottom of an act or deed, wrote by his own hand.

SIGNATURE *of the court of Rome*, is a ſupplication anſwered by the pope, whereby he grants a favour, diſpenſation or collation to a benefice, by putting the fiat to it with his own hand; or the conſenſum is written in his preſence. This ſignature at the bottom of the ſupplication, gives the name to the whole inſtrument.

SIGNATURE, in printing, is a letter put at the bottom of the firſt page at leaſt, in each ſheet, as a direction to the binder, in folding, gathering, and collating them. The ſignatures conſiſt of the capital letters of the alphabet, which change in every ſheet: if there be more ſheets than letters in the alphabet, to the capital letter is added a ſmall one of the ſame ſort, as A a, B b; which are repeated as often as neceſſary. In large volumes it is uſual to diſtinguiſh the number of alphabets, after the firſt three or four, by placing a figure before the ſignature as 5 B, 6 B, *&c.*

SIGNATURE is alſo uſed, by ſome naturaliſts, for the reſemblance a vegetable or mineral bears to a part of the human body; which, by ſome fantaſtical people, is ſuppoſed to indicate its virtues and uſe.

SIGNET, one of the king's ſeals, made uſe of in ſealing his private letters, and all grants that paſs by bill ſigned under his majeſty's hand it is always in the cuſtody of the ſecretaries of ſtate. See the article SECRETARY.

SIGNIFICATION, in general, denotes the meaning of a ſign, word, phraſe, and the like.

In law, it is uſed for the notifying an act, *&c.* to the oppoſite party, by a copy thereof given and atteſted by the proper officer.

SIGNIFICAVIT, in law, a writ which iſſues out of the court of chancery, on a certificate given by the ordinary of a perſon's ſtanding excommunicated forty days, in order to have him impriſoned till he ſubmits to the authority of the church. See EXCOMMUNICATION.

SIGNING, in law. See SIGNATURE.

SIGUENCA, a city of old Caſtile, in Spain, ſixty miles north-eaſt of Madrid.

SILENE, SMALL-FLOWERED CAMPION, in botany, a genus of the *decandria trigynia* claſs of plants, the flower of which conſiſts of five petals; and its fruit is cylindraceous, divided into three or five cells, and containing numerous kidney-ſhaped ſeeds.

SILER, in botany, a ſpecies of liguſticum. See the article LIGUSTICUM.

SILER is alſo uſed for the plant ſeſeli. See the article SESELI.

SILESIA, a dutchy belonging to the king of Pruſſia, two hundred miles long, and ſeventy broad: it is bounded by Brandenburgh on the north, by Poland on the eaſt, by Hungary on the ſouth, and by Moravia and Bohemia on the weſt.

SILIQUA, a term uſed by botaniſts to denote a pod. See the article POD.

SILIQUA is alſo a name given to the ceratonia. See the article CERATONIA.

SILIQUASTRUM, in botany, the name by which Tournefort calls the cercis of Linnæus. See the article CERCIS.

SILIQUOSE PLANTS, thoſe which produce pods, and otherwiſe called leguminous. See the article LEGUME.

SILISTRIA, a city of european Turky, in the province of Bulgaria, ninety miles eaſt of Niſſa: eaſt long. 25°, north lat. 42° 40′.

SILK, *ſericum*, in natural hiſtory, is properly an animal fluid, hardened by the air; being an extremely ſoft and gloſſy thread, ſpun by the bombyx or ſilk-worm, the body of which conſiſts of eleven rings: it produces a ſpecies of phalenæ or moths, with pectinated wings, but no tongue. See PHALENÆ.

The humours, found in the body of this inſect, approach to the nature of ſilk; ſince, on being rubbed in the hand, they leave a ſolid cruſt behind. In the ſides of the belly, all about the ventricle, there are depoſited a vaſt number of veſſels, which contain the ſilky juice; theſe run with various windings and meanders to the mouth, and are ſo diſpoſed, that the creatures can diſcharge their contents at pleaſure at the mouth; and according to the nature of the juices, that they are ſupplied with, furniſh different ſorts of ſilk from them, all

the fluid contents of theſe veſſels hardening in the air into that ſort of thread, that we find the web, or balls of this creature conſiſt of.

As ſoon as the ſilk-worm is arrived at the ſize and ſtrength neceſſary for beginning his cod, he makes his web; for it is thus they call that ſlight tiſſue, which is the beginning and ground of this admirable work. This is his firſt day's employment. On the ſecond, he forms his folliculus or ball, and covers himſelf almoſt over with ſilk. The third day he is quite hid, and the following days employs himſelf in thickening and ſtrengthening his ball, always working from one ſingle end, which he never breaks by his own fault, and which is ſo fine, and ſo long, that thoſe who have examined it attentively, think they ſpeak within compaſs, when they affirm, that each ball contains ſilk enough to reach the length of ſix engliſh miles.

In ten days time the ball is in its perfection, and is now to be taken down from the branches of the mulberry tree, where the worms have hung it. But this point requires a deal of attention; for there are ſome worms more lazy than others, and it is very dangerous waiting till they make themſelves a paſſage, which uſually happens about the fifteenth day of the month.

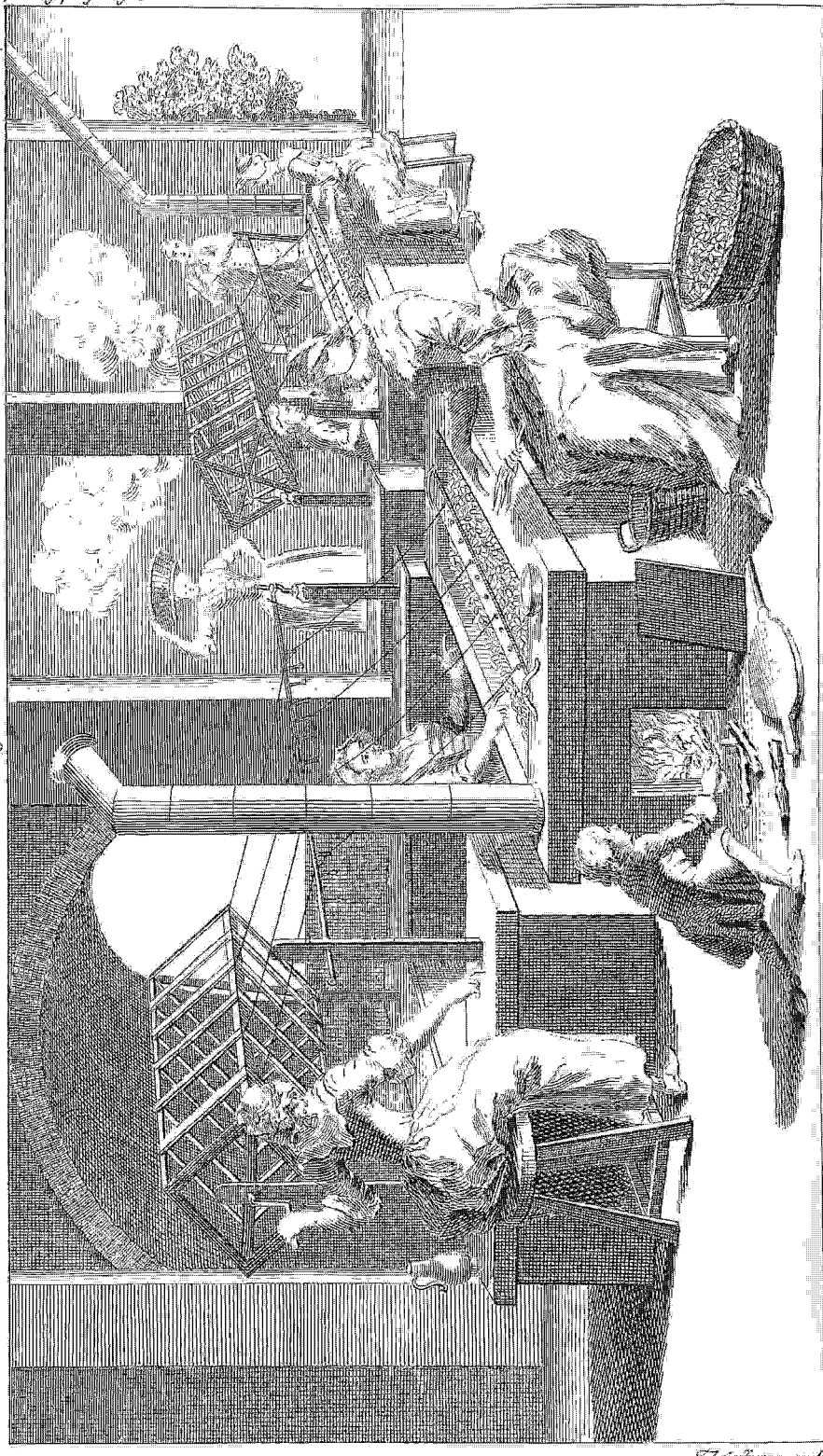
The firſt, fineſt, and ſtrongeſt balls are kept for the grain, the reſt are carefully wound; or if it is deſired to keep them all, or if there be more than can be well wound at once, they lay them for ſome time in an oven moderately hot, or elſe expoſe them, for ſeveral days ſucceſſively, to the greateſt heats of the ſun, in order to kill the inſect, which, without this precaution, would not fail to open itſelf a way to go and uſe thoſe new wings abroad, it has acquired within.

Ordinarily, they only wind the more perfect balls; thoſe that are double, or too weak, or too coarſe, are laid aſide, not as altogether uſeleſs, but that, being improper for winding, they are reſerved to be drawn out into ſkains. The balls are of different colours; the moſt common are yellow, orange-colour, iſabella, and fleſh-colour; there are ſome alſo of a ſea-green, others of a ſulphur-colour, and others white; but there is no neceſſity for ſeparating the colours and ſhades to wind them apart, as all the colours are to be loſt in the future ſcouring and preparing of the ſilk.

In the Philoſophical Tranſactions, n° 252, we find the following obſervations concerning the goodneſs of ſilk, which is beſt diſtinguiſhed by its lightneſs. The organcine ſilk is the beſt of any made in the country of Piedmont, and two threads are equal in fineneſs, that is in ſmoothneſs, thickneſs, and length, for the thread of the firſt twiſt. For the ſecond, it matters not whether the ſingle thread be ſtrong before the two are joined, unleſs to ſee whether the firſt twiſt prove well. It is neceſſary that the ſilk be clean; and it is to be obſerved, that the ſtraw-coloured is generally the lighteſt, and the white the heavieſt of all. The ſkains ſhould be even, and all of an equality, which ſhews that they were wrought together; otherwiſe we may with juſtice ſuſpect that it is refuſe ſilk, and cannot be equally drawn out and ſpun, for one thread will be ſhorter than the other, which is labour and loſs.

It will alſo be requiſite to ſearch the bale more than once, and take from out of the parcels a ſkain to make an eſſay; for unleſs it be known by trial what one buys, there is the greateſt danger of being cheated in this commodity. To make an eſtimate, and know the lightneſs, fix the eſſay upon one eighth of a portée, or hand of ſilk of a hundred and ten aunes or ells of Lyons in length, and ſee what it makes of aunes by the eighth part. The ſkain, which is of eighty threads, muſt be multiplied by a hundred and ten aunes of Lyons, and from this number muſt be deducted one eighth; as for example, 110 by 80 makes 8800, the eighth part of which is 1100; and this is the eighth part of a portée, or hand of ſilk. Now to calculate what theſe 1100 aunes weigh, which is the eighth part of a portée, or of 110 aunes of Lyons, it will be proper to take a ſkain out of the parcels, which you take from out of the bale which you judge may contain, at leaſt, 1100 aunes, to make the one eighth part of a portée, which portée muſt be divided on two bobbings, half on each; then fix the two bobbings on the center, or beam, and from thence paſs it through the comb hurdiſſoir, *viz.* 550 from the two bobbings, will make 1100, which will be one eighth part of what you deſire to know. This done, you cut off your ſilk, and carry it to put on the hurdiſſoir; then weigh it, and multiply the weight by eight, it will weigh juſt as much as

a por-



Winding of SILK

T. Jefferys sculp.

a portée of 110 aunes of Lyons, which is the general rule for calculating. When they draw the ſilk out by this means, one may learn to adjuſt the weight.

There are ſilks of Piedmont, which are very light and clean, and are to be preferred before any on the ſale: the portée of ſilk of the lighteſt weighs near twenty-four penny-weights, and from this it ariſes in gravity to twenty-five, and twenty-ſix penny-weights the portée, and ſometimes to twenty-ſeven and twenty-eight; but even theſe weights may be diſpenſed with, provided that the other qualities be good, that is, that it be well wrought, even and clean. When the ſilk is more than twenty-eight penny-weights the portée, it muſt always be proportionably cheaper.

Methods of preparing SILKS. The ſeveral preparations which ſilks undergo to fit them to be uſed in the manufacture of ſilken ſtuffs, are reeling, ſpinning, milling, bleaching, and dyeing. To wind ſilks from off the balls, two machines are neceſſary; the one a furnace, with its copper; the other a rell, or frame, to draw the ſilk. The winder, then ſeated near the furnace, throws into the copper of water over the furnace (firſt heated and boiled to a certain degree, which cuſtom alone can teach) a handful or two of balls, which have been firſt well purged of all their looſe furry ſubſtance. She then ſtirs the whole very briſkly about with birchen rods, bound and cut like bruſhes; and when the heat and agitation have detached the ends of the ſilks of the pods, which are apt to catch on the rods, ſhe draws them forth, and joining ten or twelve, or even fourteen of them together, ſhe forms them into threads, according to the bigneſs required to the works they are deſtined for: eight ends ſufficing for ribbands; and velvets, *&c.* requiring no leſs than fourteen. The ends, thus joined into two or three threads, are firſt paſſed into the holes of three iron-rods, in the fore-part of the reel, then upon the bobbings, or pullies, and at laſt are drawn out to the reel itſelf, and there faſtened; each to an end of an arm or branch of the reel. Thus diſpoſed, the winder, giving motion to the reel, by turning the handle, guides the threads; ſubſtitutes new ones, when any of them break, or any of the balls are wound out; ſtrengthens them, where neceſſary, by adding others; and takes away the balls wound out, or that, having been pierced, are full of water. See plate CCXLIX.

In this manner, two perſons will ſpin and reel three pounds of ſilk in a day; which is done with greater diſpatch than is made by the ſpinning-wheel or diſtaff. Indeed, all ſilks cannot be ſpun and reeled after this manner; either by reaſon the balls have been perforated by the ſilk-worms themſelves, or becauſe they are double, or too weak to bear the water; or becauſe they are coarſe, *&c.* Of all theſe together, they make a particular kind of ſilk, called floretta; which being carded, or even ſpun on the diſtaff, or the wheel, in the condition it comes from the ball, makes a tolerable ſilk.

As to the balls, after opening them with ſciſſars, and taking out the inſects (which are of ſome uſe for the feeding of poultry) they are ſteeped three or four days in troughs, the water whereof is changed every day to prevent their ſtinking. When they are well ſoftened by this ſcouring, and cleared of that gummy matter the worm had lined the inſide withal, and which renders it impenetrable to the water, and even to air itſelf, they boil them half an hour in a lye of aſhes, very clear and well ſtrained: and after waſhing them out in the river, and drying them in the ſun, they card and ſpin them on the wheel, *&c.* and thus make another kind of floretta, ſomewhat inferior to the former.

As to the ſpinning and reeling of raw ſilks off the balls, ſuch as they are brought from Italy and the Levant, the firſt is chiefly performed on the ſpinning-wheel; and the latter, either on hand-reels, or on reels mounted on machines, which ſerve to reel ſeveral ſkains at the ſame time. See the article REEL.

As to the milling, they uſe a mill compoſed of ſeveral pieces, which may mill two or three hundred bobbins at once, and make them into as many ſkains.

For the dyeing of ſilks. See the article DYEING.

SILK, in medicine, is very little uſed for medicinal purpoſes; though if the bags were burnt in a cloſe veſſel, in the ſame manner as ſponge, they would undoubtedly prove a medicine of ſimilar, and probably of ſuperior virtue: they yield a larger quantity of volatile ſalt, than any other animal ſubſtance we know of; and the ſpirit of raw ſilk, rectified with ſome eſſential oil, makes the medi-

cine

cine known by the name of engliſh drops. See the article DROPS.

Spider-SILK, that prepared of the webs of ſpiders; which, according to Reaumur, is inferior to that obtained from the bags of the ſilk-worm, both in ſtrength and luſtre.

Duties upon SILKS. Raw long ſilks of all ſorts, except from Bengal, pay, on importation, a duty of 1s. $11\frac{10}{100}$d. the pound, containing twenty-four ounces; and draw back, on exportation, 1s. $8\frac{25}{100}$d. Bengal raw-ſilk pays, on importation, 2s. $4\frac{72\frac{1}{2}}{100}$d. the pound of twenty-four ounces; and draws back, on exportation, 2s. $1\frac{87\frac{1}{2}}{100}$d. Raw ſhort ſilk pays, on importation, only 1s. $3\frac{40}{100}$d. the pound of twenty-four ounces; and draws back, on exportation, 1s. $1\frac{1}{2}$d. Sattin-ſilk pays, on importation, by the pound of ſixteen ounces, 7s. $8\frac{40}{100}$d. and draws back, on exportation, 6s. 9d. But raw ſilks, imported directly from any of the britiſh american plantations, and of the growth of the ſame, pay no duty at all. Thrown ſilk, dyed, pays, on importation, by the pound of ſixteen ounces, a duty of 19s. 3d. and, on being exported, draws back 16s. $10\frac{50}{100}$d. As to manufactured or wrought ſilks, french alamodes or luſtrings, pay, on importation, by the pound of ſixteen ounces, 2l. 15s. $10\frac{32}{100}$d. but if not french, only 1l. 15s. $10\frac{32}{100}$d. Indian wrought ſilks, imported in britiſh ſhipping, and duly entered at the port of London, pay only $4\frac{72\frac{1}{2}}{100}$d. the pound of ſixteen ounces. Wrought ſilks of the manufacture of Italy, imported in britiſh ſhips, pay 12s. $1\frac{55}{100}$d. the pound of ſixteen ounces; and draw back, on exportation, 11s. $7\frac{21\frac{2}{3}}{100}$d. All french wrought ſilks, except alamodes and luſtrings, pay, on importation, only 1l. 7s. $11\frac{16}{100}$d. the like pound; and draw back, on exportation, 17s. $3\frac{56}{100}$d. Wrought ſilks, except alamodes and luſtrings, from any part of the world, pay, on importation, only 14s. $2\frac{16}{100}$d. the like pound; and draw back, on exportation, 13s. $6\frac{56}{100}$d. Flowered ſilks, or thoſe mixed with gold or ſilver, except of India, Perſia, or China, pay, on importation, 1l. 1s. $6\frac{40\frac{1}{2}}{100}$d. the like pound; and draw back, on exportation, 19s. $10\frac{45\frac{1}{2}}{100}$d.

SILLON, in fortification, the ſame with envelope. See ENVELOPE.

SILPHIUM, in botany, a genus of the *ſyngeneſia-polygamia-neceſſaria* claſs of plants, the general corolla whereof is radiated with a great number of hermaphrodite floſcules in the diſc, and with a fewer number of the female ones in the radius: the partial corolla of the hermaphrodite is monopetalous, infundibuliform, and quinquedentated; there is no pericarpium; the female ſeed is ſolitary, membranaceous, and obverſely cordated.

SILVER, *argentum*, ☽, in natural hiſtory, the pureſt and moſt fixed of all metals, except gold, for the ſpecific gravity of which, ſee the article GRAVITY.

Silver, though frequently found native and pure, is however often found in the ſtate of ore; as among the grey ores of copper, the ore of lead, of cobalt, antimony, and other mineral bodies. The proper and peculiar ores of ſilver are of various appearances; as in that of a ſoft ſubſtance of a blackiſh-blue colour, greatly reſembling lead: another ore of ſilver is in form of brown or browniſh-yellow obſcurely tranſparent maſſes, not a little reſembling the coarſer ſorts of amber: there is another ſilver-ore of a very bright and beautiful red, a ſmooth even ſurface, and conſiderably pellucid, reſembling very much native ſandarach. Theſe are the more uſual and determinate ores of ſilver, which in many of the german mines are blended all together, ſometimes with the black kind wholly covering the red: the black kind is often ſoft enough to be cut with a knife.

The method of precipitating ſilver out of an eaſily fuſible ore is this: pound the ore very fine in an iron-mortar, and for an aſſay weigh one docimaſtical centner of it, and eight centners of granulated lead; pour into a new teſt about half the lead, ſtir it about with a finger, and ſpread it over the cavity of the teſt; put upon this lead the pounded ore, and then cover it with the remainder of the lead; put the teſt, thus loaded, under the muffle of an aſſay-furnace, and in the hinder part of it make the fire, and encreaſe it to a conſiderably high degree. The ore will ſoon be raiſed out of the melted lead, and ſwim upon it; a little after it will grow clammy, melt, and be thrown

thrown toward the border of the teſt; then the ſurface of the lead will appear clear in the middle of the teſt, and will ſmoak and boil; the fire muſt now be made a little leſs, till the boiling ceaſes, for a quarter of an hour, and then made violent again, and the ſurface of the lead will then diminiſh by degrees, and be covered with a maſs of ſcoriæ. At this time have at hand an iron hook ready heated, and with this ſtir all the matter from the ſides into the middle of the teſt; if the matter, adherring to the hook from the ſtirring, melts quickly again, and the extremity of the hook, when cold, is found covered with a ſhining cruſt, the ſcorification is perfected; but if the ſcoriæ feel clammy while ſtirred, and adhere in quantity to the hook, and are of a rough ſurface, the ſcorification is not perfect, but the matter adhering to the hook muſt be ſtruck off with a hammer, and beat to powder, and returned into the teſt, and the fire continued till the ſcorification is perfected; then take out the teſt, and pour the whole contents into a mould, heated and greaſed. This is the firſt proceſs, and this uſually takes up three quarters of an hour: the ſilver is now in form of a regulus, and muſt be ſeparated by the coppel in the uſual way. See the article COPPELLING.

When ſilver-ores are rendered refractory by an admixture of mundic, they muſt be pounded and put into a covered teſt, which is to be placed in an aſſay-furnace under a muffle, till all the mundic is evaporated; which you may know by the ceſſation of the ſmoke from the ore: let this roaſted ore cool leiſurely; then powder it fine, and mix it with an equal quantity of glaſs of lead reduced likewiſe to fine powder; and, laſtly, ſcorify the whole till the ſilver appear in the form of a bright bead in the middle of the teſt.

When the ſilver is well purified, ſo that all heterogeneous matter, either metallic or other, that might be mixed with it, is extracted, they ſay it is twelve carats fine. This is the expreſſion they uſe to denote the quality of the pureſt ſilver, without any mixture or alloy; but, if there ſhould remain any, they deduct the weight of the mixture from the principal weight, and the remainder ſhews the value of the ſilver. The carat conſiſts of twenty-four grains: ſo that, when to the weight of twelve carats there are twelve grains of mixture, the value of the ſilver is eleven carats twelve grains; and ſo of any other.

Silver, though conſiderably hard in compariſon of lead or gold, is yet malleable and ductile to a very great degree, and may be drawn out into an extremely fine wire. It is leſs capable of ruſt than any other metal, except gold; but it readily becomes black on being rubbed with ſulphur. It requires a middle degree of fire to fuſe it; bearing unaltered a ſtronger degree of heat than either lead or gold, but melting much more eaſily than copper or iron. It, indeed, grows red-hot, but then melts immediately. It amalgamates readily enough with mercury; the readieſt way of mixing them is to have the ſilver in fine filings, very clear from greaſe, and to rub it in a mortar with the mercury. It is fixed in a common fire, ſo as to loſe ſcarce any thing; and perhaps, truly ſpeaking, not any thing at all, in the fierceſt degree of it, if never ſo long continued: it has been tried by Boerhaave for two months together, in the eye of a glaſs-houſe-furnace, and found to loſe only one twelfth part of its weight in the operation; and it is highly probable, that even this loſs might be owing to the ſilver's not being perfectly purified at firſt.

Silver, expoſed to the fierceſt fire, collected in the focus of a large burning-glaſs, immediately becomes red-hot, and melts; it then crackles, and afterwards emits a thick ſmoak: ſoon after this, it is covered with a duſty ſubſtance, or calx. If the ſilver have been refined by means of antimony, the calx is of a yellowiſh hue, and, if kept long enough in the focus, it will vitrify in the ſame manner as gold; but, if it have been refined with lead, the calx is whiter, and, Homberg aſſures us, will never vitrify, however long expoſed, even to that degree of heat.

Silver is purified by means of lead, and bears its action without loſs. Fuſed with antimony, if the effect be not carefully prevented, it turns to ſcoria, and becomes volatile: there is no metal, indeed, except gold alone, that bears the teſt with this rapacious mineral, in the common way. See the article GOLD.

The proper ſolvent of ſilver is aqua fortis; it is diſſolved readily by this, and not at all by the common aqua regia; yet, under certain circumſtances, aqua regia will diſſolve ſilver: the firſt phlegm which

which ariſes in diſtilling that menſtruum, when newly made, and when it has been ſome time in digeſtion with gold, will diſſolve ſilver, and will not touch gold; though it cannot but be acknowledged, this liquor is as much aqua regia, as what follows in the diſtillation. This, however, is an experiment of mere curioſity, not likely ever to occur in the way of buſineſs, and in that reſpect, though we are acquainted with this accident, which was accidentally diſcovered by Homberg, we may ſay in general, that aqua fortis diſſolves ſilver, and not gold; and aqua regia gold, and not ſilver. If but the ſmalleſt quantity of ſea-ſalt be put into aqua fortis, it will no longer give a clear ſolution of ſilver. This gives us a teſt for the goodneſs of aqua fortis: and to this difference in the effect of theſe two menſtrua we owe the only method of ſeparating ſilver from gold, without loſs. If ſilver be fuſed with lead, it loſes its ſound, and its bright colour; if melted with tin, it becomes extremely brittle, and the two metals are very difficultly ſeparated again. It melts and mixes eaſily with copper, and by that means acquires a hardneſs which fits it for our coins and utenſils, much better than in its pure natural ſtate. See ASSAYING.

Silver, melted with arſenic (which is eaſily done by mixing the arſenic with a little chalk and a little tartar, then wetting it with common water, and then ſtratifying the ſilver with the maſs) receives a part of that ſubſtance into its own body, and ſhews the ſingular effect it has on it, in its loſing all its malleability; but the arſenic may be ſeparated from it again by only melting it in a ſtrong fire.

Silver, melted with biſmuth, is afterwards much the more eaſily amalgamated with quickſilver; and what is yet more remarkable, is, that it by this means becomes ſo attenuated, that it will paſs through a leather in much larger quantity mixed with the mercury, than it would otherwiſe have done. It is made much more fuſible, as well as volatile, by antimony, and is ſtrangely debaſed by the fume of burning ſulphur. Silver is ſaid by ſome to be able to colour the natural gems, and factitious glaſſes, and paſtes with a fine blue; but this is an error wholly owing to the alloy of copper, which is in moſt ſilver, and which has occaſionally ſhewn this effect in the artificial products of this kind. But though ſilver is not capable of communicating any colour to foſſils, it has, however, a power of influencing their figure, and that in a very ſingular manner: It has long been known, that iron determines the cryſtals it enters the compoſition of, into rhombs, and lead into cubes; but it has not been known that theſe truncated cryſtals and ſpars, preſerved as great curioſities in the cabinets of the curious, owe their figure to ſilver, till ſilver was lately ſeparated from them. As certainly, therefore, as iron or lead can form cryſtal into cubes and rhombs, ſo certainly can ſilver, even in a very ſmall quantity, influence the figure of thoſe foſſils, and form them into columns truncated at each end.

If ſilver be melted with common ſalt, it blends with proper management into a ſemipellucid maſs, called luna cornea; which is very difficultly reduced into ſilver again, as being ſo volatile as to fly wholly off in a ſmall degree of heat.

The chemiſts, who ſuppoſe ſilver to have ſome peculiar affinity to the moon, therefore call it luna: their character for it is ☽; by which they mean to denote the half of gold, whoſe character is a complete circle; the inner line of this figure, if turned outward, would make it the complete mark of gold.

Refining of SILVER. See REFINING.

Medicinal virtues and preparations of SILVER. The chemiſts have ſaid great things of the virtues of ſilver, and, accordingly, have endeavoured to introduce a long train of lunar medicines; ſuch as argentum potabile, diaphoreticum lunare, bezoardicum lunare, and fifty others as pompous as inſignificant: the only preparations of ſilver, which keep up their credit in the ſhops, are the lunar cryſtals and cauſtics. See the articles CRYSTAL and CAUSTIC.

As to the pretended tinctures of ſilver, being only tinctures of copper, they are by no means ſafe internally; and every coloured tincture of ſilver may be boldly declared to be of this kind.

The only preparation, therefore, we ſhall add, is, that liquor kept by many as a mighty ſecret for tinging hair of any colour to a fine black. It is thus prepared. take three drams of crude mercury, and diſſolve it in an ounce and half of aqua fortis; add to this, two ounces of the ſolution of ſilver in aqua fortis, and

and pour the whole into a veſſel of clean water, ſo much in quantity, that the liquor may not be able to corrode copper, nor raiſe bubbles on its ſurface; and when it has ſtood a month, it may be uſed with ſafety. See MERCURY.

SILVER-LEAF, that beaten out into fine leaves for the uſe of the gilders, which is performed in the ſame manner as gold-leaf. See GOLD-LEAF.

SILVER-WIRE, that drawn out into fine wire; for the manner of doing which, ſee the article GOLD-WIRE.

Shell-SILVER, is prepared of the ſhreads of ſilver-leaves, or of the leaves themſelves, for the uſe of painters, after the ſame manner as ſhell-gold. See GOLD.

SILVER-TREE, *eugenia*, in botany, a ſmall but beautiful tree of Jamaica, belonging to the *icoſandria-monogynia* claſs of plants; its leaves are ſmooth, very thin, and grow in pairs; the flowers are ſmall and whitiſh, and grow at the alæ of the leaves. See EUGENIA.

SILVERING, the covering of any thing with ſilver. It is uſual to ſilver metals, wood, paper, *&c.* which is performed either with fire, oil, or ſize. Metal-gilders ſilver by the fire; painter-gilders all the other ways. See GILDING.

To ſilver copper or braſs: 1. Cleanſe the metal with aquafortis, by waſhing it lightly, and immediately throwing it into fair water; or by heating it red hot, and ſcouring it with ſalt and tartar, and fair water, with a ſmall wire-bruſh. 2. Diſſolve ſome ſilver in aquafortis, in a broad-bottomed glaſs veſſel, or of glazed earth, then evaporate away the aquafortis over a chaffing-diſh of coals. 3. Put five or ſix times its quantity of water, or as much as will be neceſſary to diſſolve it perfectly, on the remaining dry calx; evaporate this water with the like heat; then put more freſh water, and evaporate again; and if need be, the third time, making the fire towards the latter end ſo ſtrong, as to leave the calx perfectly dry, which, if your ſilver is good, will be of a pure white. 4. Take of this calx, common ſalt, cryſtal of tartar, of each a like quantity, or bulk, and mixing well the whole compoſition, put the metal into fair water, and take of the ſaid powder with your wet fingers, and rub it well on, till you find every little cavity of the metal ſufficiently ſilver'd over. 5. If you would have it richly done, you muſt rub on more of the powder, and in the laſt place waſh the ſilver'd metal in fair water, and rub it hard with a dry cloth.

SILVERING *of glaſſes*. See the article FOLIATING *of looking glaſſes*.

SIMATIUM, or SIMAISE, in architecture. See the article CYMATIUM.

SIMEREN, a city of Germany, in the palatinate of the Rhine: eaſt long. 7° 5′, north lat. 50°

SIMIA, the MONKEY, in zoology, a genus of quadrupeds, of the order of the anthropomorpha, the characters of which are, that the face is naked, the claws rounded and flattiſh in ſome degree, like the nails on the human hand, and there is an eye lid each way. See the articles MONKEY and ANTHROPOMORPHA.

This genus, among ſeveral other ſpecies, comprehends the ſatyr, the baboon, and the rat-ape. See SATYR, and BABOON.

SIMILAR, in arithmetic and geometry, the ſame with like. Thoſe things are ſaid to be ſimilar or like, which cannot be diſtinguiſhed but by their compreſence, that is, either by immediately applying the one to the other, or ſome other third to them both, ſo that there is nothing found in one of the ſimilar things but is equally found in the other, notwithſtanding their ſimilitude may differ in quantity; and ſince in ſimilar things there is nothing wherein they differ beſides the quantity, quantity itſelf is the internal difference of ſimilar things. In mathematics, ſimilar parts have the ſame ratio to their wholes, and if the wholes have the ſame ratio to the parts, the parts are ſimilar. See PART. Similar angles are alſo equal angles. In ſolid angles, when the planes under which they are contained are equal, both in number and magnitude, and are diſpoſed in the ſame order, they are ſimilar, and conſequently equal. Similar arches of a circle are ſuch as are like parts of their whole circumferences, and conſequently equal. Similar plane numbers are thoſe numbers which may be ranged into the form of ſimilar rectangles, that is, into rectangles whoſe ſides are proportional; ſuch are 12 and 48, for the ſides of 12 are 6 and 2, and the ſides of 48 are 12 and 4; but 6 : 2 : : 12 : 4, and therefore thoſe numbers are ſimilar. Similar polygons are ſuch as have their angles ſeverally equal, and the ſides about thoſe angles proportional. Similar rectangles are thoſe which have their ſides about the equal angles proportional; hence, 1. All ſquares are ſimilar rect-

angles. 2. All ſimilar rectangles are to each other as the ſquares of their homologous ſides. Similar right-lined figures are ſuch as have equal angles, and the ſides about thoſe equal angles proportional. Similar ſegments of a circle are ſuch as contain equal angles. Similar curves: two ſegments of two curves are called ſimilar, if, any right lined figure being inſcribed within one of them, we can inſcribe always a ſimilar right lined figure in the other. Similar conic ſections: two conic ſections are ſaid to be ſimilar when any ſegment being taken in the one, we can aſſign always a ſimilar ſegment in the other. Similar diameters of two conic ſections: the diameters in two conic ſections are ſaid to be ſimilar, when they make the ſame angles with their ordinates. Similar ſolids are ſuch as are contained under equal numbers of ſimilar planes alike ſituated. Similar triangles are ſuch as have their three angles reſpectively equal to one another. Hence, 1. All ſimilar triangles have the ſides about their angles proportional. 2. All ſimilar triangles are to one another as the ſquares of their homologous ſides. See the articles ANGLE, ARCH, NUMBER, POLYGON, &c.

SIMILAR BODIES, in natural philoſophy, are ſuch as have their particles of the ſame kind and nature with one another. See BODY, PARTICLE, &c.

SIMILAR DISEASE, in medicine, denotes a diſeaſe of ſome ſimple, ſolid part of the body; as of a fibre with regard to its tenſion or flaccidity; of a membrane; a nervous canal, or the like. See DISEASE.

SIMILAR FIGURES, in geometry, ſuch as have their angles reſpectively equal, and the ſides, about the equal angles, proportional. See the articles RECTANGLE, TRIANGLE, and POLYGON.

SIMILAR PARTS, in anatomy, are thoſe parts of the body which at firſt ſight appear to conſiſt of like parts, or parts of the ſame nature, texture, and formation; of theſe we uſually reckon ten, *viz.* the bones, cartilages, ligaments, membranes, fibres, nerves, arteries, veins, fleſh, and ſkin. See BONE, CARTILAGE, &c.

SIMILE, or SIMILITUDE, in rhetoric, a compariſon of two things, which though different in other reſpects, yet agree in ſome one. The difference between a ſimile and compariſon, is ſaid to conſiſt in this, that the ſimile properly belongs to whatever we call the quality of the thing, and the compariſon to the quantity. See the article COMPARISON.

SIMILITUDE, in arithmetic, geometry, &c. denotes the relation of two things ſimilar to each other. See SIMILAR.

SIMONICAL is applied to any perſon guilty of ſimony. See SIMONY.

SIMONIANS, in church hiſtory, a ſect of antient heretics, ſo called from their founder, Simon Magus, or the magician. The hereſies of Simon Magus were principally his pretending to be the great power of God, and thinking that the gifts of the Holy Ghoſt were venal, and to be purchaſed with money. He is ſaid to have invented the Æons, which were ſo many perſons of whom the Godhead was compoſed. His concubine Helen, he called the firſt intelligence, and mother of all things; and ſometimes he called her Minerva, and himſelf Jupiter. Simon Magus gained a great many proſelytes, who paid himſelf and his concubine divine worſhip; theſe were the earlieſt heretics, and thoſe that St. John, St. Peter and St. Paul, in their epiſtles, ſo often warn the chriſtians againſt.

SIMONY, in eccleſiaſtical law, the crime of buying or ſelling ſpiritual gifts or preferments. In the antient chriſtian church, this crime was always thought to be committed when men either offered or received money for ordinations. The apoſtolical canons lay a double puniſhment both of depoſition and excommunication, on ſuch of the clergy as were found guilty of it. This was the firſt ſort of ſimony, and that which was moſt properly ſo called, and to this the antients reduced the exacting of any reward for adminiſtring the euchariſt or baptiſm, or for any ſpiritual offices. A ſecond ſort of ſimony conſiſted in buying the ſpiritual preferments of the church; this was puniſhed with depoſition in any biſhop, who promoted any church-officer for the ſake of lucre; and the perſons ſo promoted, were to be degraded from their office. By the laws of Juſtinian, every elector was to depoſe upon oath, that he did not chuſe the perſon elected for any gift or promiſe, or friendſhip, or any other cauſe, but only becauſe he knew him to be a man of the true catholic faith, of unblamable life, and good learning. This laſt ſort of ſimony was, when men by ambitious arts and undue practices, got themſelves inveſted in an office or preferment to which they had

had no regular call, or when they intruded themſelves into other mens places, which were legally filled before. The caſuiſts for the Church of Rome maintain, that all compacts or bargains in which benefices are concerned, are ſimonical, when it is done without the pope's concurrence; but that, once obtained, gives a ſanction to the thing, which they found upon this univerſal propoſition, that the pope cannot commit ſimony in beneficiary matters, ſince he hath a power ſo abſolute over all the eccleſiaſtical goods and benefices, that he can unite, divide, and beſtow them in whatever manner he pleaſes.

Againſt the corruption of ſimony, there have been many canons made in our own church, which puniſhes the offender with deprivation, diſability, *&c.* and by a ſtatute of the 31 Eliz. it is enacted, that if any perſon for any ſum of money, reward, gift, profit, or benefit, or by reaſon of any promiſe, agreement, grant, bond, covenant, or other aſſurance, ſhall preſent, or collate any perſon to any benefice with cure, dignity, or living eccleſiaſtical, every ſuch preſentation, or collation, and every admiſſion or induction thereupon, ſhall be utterly void, and the crown ſhall preſent for that turn; and the perſon that ſhall give or take any ſum of money, *&c.* ſhall forfeit double the value of one year's profit of any ſuch benefice; and the perſon ſo corruptly taking any ſuch benefice, ſhall from thenceforth be diſabled to have and enjoy the ſame.

SIMPLE, *ſimplex*, ſomething not mixed or compounded, in which ſenſe it ſtands oppoſed to compound. See the article COMPOUND.

Thus we ſay, ſimple form, ſimple mode, ſimple fee, ſimple force, ſimple equation, ſimple anomaly, ſimple glands, ſimple viſion, ſimple flank, ſimple fraction, *&c.* See the articles FORM, MODE, FEE, FORCE, EQUATION, *&c.*

SIMPLE, in pharmacy, a general name given to all herbs or plants, as having each its particular virtue, whereby it becomes a ſimple remedy.

SIMPLE, in muſic, is chiefly uſed in oppoſition to double, ſometimes to a compound of ſeveral parts or figures of different values, *&c.* Simple cadence is that where the notes are equal in every part. Simple concords are thoſe wherein we hear at leaſt two notes in conſonance, as a third and fifth, and of conſequence at leaſt three parts, which is either done immediately, and called the harmonical triad, or in a more remote manner; that is, when the ſounds which are not baſs, are one or two octaves higher. This diſtance has no bad effect in the third; but in the fifth it has, and generally ſpeaking, the nearer or more immediate the concords are, the better. They alſo ſay, C ſimple, or plain, in oppoſition to C accented. Simple counter-point is a harmonical compoſition, wherein note is ſet againſt note, in oppoſition to figurative counter-point. Simple fugue, or ſimple imitation, is where one part imitates the ſinging of another for ſome meaſures. See the articles COUNTER-POINT, IMITATION, FUGUE, *&c.*

For ſimple interval, and ſimple triple, ſee the articles INTERVAL and TRIPLE.

SIMPLEX BENEFICIUM, ſignifies an inferior dignity in a cathedral, or collegiate church, a ſine-cure, penſion, or any eccleſiaſtical benefice, oppoſed to a cure of ſouls, and which therefore is conſiſtent with any parochial cure, without coming under the denomination of pluralities.

SIMPLIFYING, in eccleſiaſtical matters, is the taking away the cure of ſouls from a benefice, and diſpenſing the beneficiary from reſidence. Several benefices which have been ſimplifyed, now require reſidence, and a great number of others, which required reſidence, have been ſimplifyed: ſome uſe this word in a more extenſive ſignification, *viz.* for the ſhortening a relation, *&c.* or retrenching every thing not preciſely neceſſary.

SIMPLUDIARIA, in antiquity, a kind of funeral honours paid to the deceaſed at their obſequies.

SIMUL-CUM, in law, words that formerly were made uſe of in indictments and declarations of treſpaſs, where there were ſeveral defendants, ſome whereof were known, and others not.

SIN, a breach or tranſgreſſion of ſome divine law, or command.

SINAI, a mountain of Arabia Petrea, ſituated eaſt long. 35°, north lat. 29°, and memorable on account of the laws being given to the Jews on this mount.

SINAI, *knights of.* See CATHARINE.

SINAPI, or SINAPIS, *muſtard*, in botany, a genus of the *tetradynamia ſiliquoſa* claſs of plants, the corolla whereof conſiſts of four cruciform, roundiſh, plane, patent, and intire petals, with erect linear ungues, and ſcarcely the length of the cup; the fruit is an oblong, rough pod, con-

ſifting of two valves, and containing two cells; the ſeeds are numerous and globoſe.

Muſtard-ſeed is an attenuant and reſolvent in a very high degree; it warms the ſtomach, and excites an appetite; but its principal medicinal uſe is external in ſinapiſms, applications made to certain parts when irritation is intended, but not bliſtering. It is uſually mixed with horſe-radiſh-root, and other ingredients of the ſame kind, for this purpoſe.

SINAPISM, in pharmacy, an external medicine, in form of a cataplaſm, compoſed chiefly of muſtard-ſeed pulverized, and mixed with the pulp of figs, or with briony, garlic, onion, or the like. See the preceding article.

SINAPISTRUM, in botany, the ſame with the cleome. See CLEOME.

SINCIPUT, in anatomy, the fore-part of the head, reaching from the forehead to the coronal ſuture. See the articles HEAD and SKULL.

SINCOPORA, a promontory of Malacca in the Eaſt-Indies, ſituated in 2°, north lat. oppoſite to the iſland of Sumatra, with which this cape forms the ſtraits, called the Straits of Sincopora.

SINDON, in ſurgery, a little round piece of linnen ſilk, or lint, uſed in dreſſing a wound after trepanning. See the article TREPANNING.

SINE, or *right* SINE *of an arch*, in trigonometry, is a right line drawn from one end of that arch, perpendicular to the radius drawn to the other end of the arch; being always equal to half the chord of twice the arch. Thus, SR (plate CCL. fig. 6.) is the right ſine of the arches SA and SD.

The radius, CB, is called the whole ſine, or the ſine of 90°. The ſine-complement, or co ſine, of an arch AS, is the part CR, intercepted between the center and right ſine; ſo called, as being always equal to SH, the ſine of the complement of that arch to 90°, *viz.* SR. And the verſed ſine of an arch, AS, is the part, RA, intercepted between the right ſine, SR, and the extremity of the arch, A.

For the uſe of ſines in trigonometrical calculations, ſee the articles TRIGONOMETRY, NAVIGATION, &c.

SINE ASSENSU CAPITALI, in law, a writ lying where a biſhop, dean, prebendary, or maſter of an hoſpital, aliens the lands held in right of his biſhopric, deanery, &c. without the conſent of the chapter, or fraternity; in which caſe his ſucceſſor ſhall have this writ, and ſometimes he may enter upon ſuch alienation, and need not bring it.

SINE-CURES, eccleſiaſtical benefices without cure of ſouls. No church, where there is but one incumbent, can properly be a ſine-cure: and though the church being down, or the pariſh being become deſtitute of pariſhioners, the incumbent may be thereby neceſſarily acquitted from the actual performance of public duty; yet he is ſtill under an obligation to do it whenever a church ſhall be built, and there are a competent number of inhabitants: and in the mean time, if the church be preſentative, as moſt ſuch churches are, the incumbent is inſtituted into the cure of ſouls; ſuch benefices are rather depopulations than ſine-cures, and it will be proper for the new incumbent to read the thirty-nine articles, and the liturgy in the church-yard, &c. and to do whatever other incumbents uſually do. But a rectory, or portion of it, may properly be a ſine-cure, if there be a vicar under the rector, endowed and charged with the cure, in which caſe it does not come within the ſtatute of pluralities, 21 H. VIII. *c.* 13. Here therefore, no diſpenſation is neceſſary to hold the ſine-cure with a former living, nor need the incumbent read the articles, or divine ſervice, as required by 13 Eliz. *c.* 12. which extends only to a benefice with cure. By the above-mentioned ſtatute of Hen. VIII. not only prebends and rectories, with vicarages endowed, but deaneries, and arch-deaneries are declared to be benefices without cure.

SINE DIE, *without day*, in law, a term frequently uſed in our proceedings at common law; as when judgment is given againſt the plaintiff, he is ſaid to be in *miſericordia pro falſo clamore ſuo*; ſo when judgment paſſes for the defendant, it is entered *eat inde ſine die*, being as much as to ſay, he is diſcharged, or diſmiſſed the court.

SINEW, denotes what we properly call a nerve, though in common ſpeech, it is rather uſed for a tendon. See the article NERVE and TENDON.

SINGING, the action of making divers inflexions of the voice, agreeable to the ear, and correſpondent to the notes of a ſong, or piece of melody. See MELODY. The firſt thing to be done in learning to ſing, is to raiſe a ſcale of notes by tones and ſemi-tones to an octave, and deſcend by the ſame notes; and then to riſe and fall

fall by greater intervals, as a third, fourth, fifth, &c. and to do all this by notes of different pitch. Then theſe notes are repreſented by lines and ſpaces, to which the ſyllables *fa*, *ſo*, *la*, *mi*, are applied, and the pupil taught to name each line and ſpace thereby; whence this practice is called *ſol-faing*, the nature, reaſon, effects, &c. whereof, ſee under the article SOLFAING.

SINGULAR NUMBER, in grammar, that number of nouns and verbs which ſtands oppoſed to plural; and is uſed when we only ſpeak of a ſingle, or one, perſon, or thing. See PLURAL and NUMBER.

The Latins, French, Engliſh, &c. have no numbers but the ſingular and plural; but the Greeks and Hebrews have likewiſe a dual number, peculiar to two perſons. See LATIN, FRENCH, &c.

SINGULTUS, the HICKUP, in medicine. See the article HICKUP.

SINICAL QUADRANT. See QUADRANT.

SINISTER, ſomething on, or towards, the left-hand; ſiniſter is alſo uſed, among us, for unlucky, though in the ſacred rites of divination, the Romans frequently uſed it in an oppoſite ſenſe.

SINISTER, in heraldry. The ſiniſter ſide of an eſcutcheon is the left hand ſide; the ſiniſter chief, the left angle of the chief; the ſiniſter baſe, the left hand part of the baſe. See ESCUTCHEON, &c.

SINISTER ASPECT, among aſtrologers, is an appearance of two planets happening according to the ſucceſſion of the ſigns, as Saturn in aries, and Mars in the ſame degree of gemini.

SINISTRI, a ſect of antient heretics, thus called, becauſe they held the left hand in abhorrence, and made it a point of religion not to receive any thing therewith.

SINKING FUND, a proviſion made by parliament, conſiſting of the ſurpluſage of other funds, intended to be appropriated to the payment of the national debts; on the credit of which very large ſums have been borrowed for public uſes.

SI NON OMNES, in law, the name of a writ on aſſociation of juſtices, by which, if all in commiſſion cannot meet at the day aſſigned, it is allowed that two or more of them may proceed to finiſh the buſineſs.

SINNET, on board a ſhip, a line or ſtring made of rope-yarn, conſiſting generally of two, ſix, or nine ſtrings, which are divided into three parts, and are platted over one another, and then beaten ſmooth and flat with a wooden mallet. Its uſe is to ſave the ropes, or to keep them from galling.

SINOPE, a port-town of aſiatic Turky, ſituated on the Euxine Sea: eaſt long. 36° 25′, north lat. 42° 25′.

SINOPLE, or SENOPLE, in heraldry, denotes vert, or the green colour in armories. See the article VERT.

Sinople is uſed to ſignify love, youth, beauty, rejoicing, and liberty, whence it is, that letters of grace, abolition, legitimation, &c. are always uſed to be ſealed with green wax.

SINUATED LEAF, in botany, a leaf whichhasanumber of ſinuſes on its ſide, but thoſe ſeparated by lobes, not very long, nor themſelves indented, or notched at the edges. *Sinuato-dentated* leaf, expreſſes a leaf like the former, but with the lateral lobes of a linear figure.

SINUOSITY, a ſeries of bends and turns in arches, or other irregular figures, ſometimes jetting out, and ſometimes falling in.

SINUOUS ULCERS. See ULCER.

SINUS, in anatomy, denotes a cavity in certain bones, and other parts, the entrance whereof is very narrow, and the bottom wider and more ſpacious. Of theſe ſinuſes we find ſeveral in divers parts of the body, particularly in the internal ſurface of the os occipitis; in adults, there is a croſs, to which adheres the ſinuſes and proceſſes of the dura mater, the uſe whereof is to carry the blood from the brain, by a very peculiar mechaniſm, under the ſella equina, or turcica of the os ſphenoides; there is alſo a ſinus called the ſphenoidal ſinus; this is ſometimes double, and opens into the noſtrils; ſometimes it is totally wanting. See the articles SKULL, BRAIN, SPHENOIDES OS, DURA MATER, &c.

For the ſinuſes of the larynx and vena portæ, ſee the articles LARYNX and VENA PORTÆ.

Sinus of an artery is uſed, by ſome, for any part of an artery where its ſides are ſtretched out beyond the ordinary proportional dimenſions elſewhere. Morgagni has obſerved four ſuch ſinuſes in the aorta, three of them anſwering to the ſemilunar valves; and the fourth is all that part of the aorta between the former ſinuſes, and the origin of the common trunk of the right ſubclavian and carotid arteries. Sinus of the womb is uſed for any cavity within its ſubſtance. See UTERUS.

SINUS, in ſurgery, a little cavity, or ſaculus, frequently formed by a wound

or

or ulcer, wherein pus is collected. See WOUND, &c.

A ſinus is properly a cavity in the middle of a fleſhy part, formed by the ſtagnation and putrefaction of the blood or humours, and which has wrought itſelf from vent or exit. See FISTULA.

SION, a town of Switzerland, in the county of Valais, ſituated on the river Rhone, twenty-three miles ſouth-eaſt of the lake of Geneva, being a ſovereign ſtate.

SION-COLLEGE. See COLLEGE.

SIPHON, or SYPHON, in hydraulics, a bended pipe, one end of which being put into a veſſel of liquor, and the other hanging out of the ſaid veſſel over another, the liquor will run out from the firſt into the laſt, after the air has been ſucked out of the external or lower end of the ſiphon, and that as long as the liquor in the upper veſſel is above the upper orifice of the ſiphon. Thus, H D S (plate CCL. fig. 1. n° 1.) is a ſiphon whoſe two parts H D, D S, are called its legs, and by its operation, the water is drawn out of the upper veſſel A B C D, into the lower *a b*. When you have ſucked out the air at S, the water follows, coming in at H, going in the direction H G D S, and out at S, as long as the ſurface E F is above I H; the level of the mouth of what is called the driving leg of the ſiphon, being that in which the water goes up, as that through which it goes down is called the iſſuing leg, and is always longer than the driving leg. Now, the cauſe of the ſiphon's running is this. The air which preſſes into the veſſel A B C D, repreſented by the column K L, ſuſtains the column of water L D, in the ſhort leg of the ſiphon, preſſing againſt that air with its perpendicular height D F, whilſt the column of air M S, preſſing upwards againſt the hole of the long or iſſuing leg D S (which acts according to the height D C) muſt yield and ſuffer the water to run out as long as the leg D S is longer, or rather higher in perpendicular than D G. For ſince K and M are ſuppoſed at top of the atmoſphere, the column K L and M S are equal in height and preſſure, (the height of L above S being of no account in the height of the atmoſphere) as long as M S is acted upon by the deſcending water D S, whoſe height is from D to S (ſuppoſe fifteen inches) an height ſuperior to that of the column D G (ſuppoſe of ſeven inches) ſupported by the column of air K L, the column M S muſt yield to the water iſſuing out at S; and however the ſurface of the water E F deſcends, the column K L, by its preſſure, will always overcome the reſiſtance of the column M S, becauſe it has a leſs height of water to ſuſtain than M S has. If the mouth of the iſſuing leg had been at T, the water would hang in equilibrio, filling both legs of the ſiphon, when the water is come down in the upper veſſel to I H T, becauſe then the two columns of air K L and M S will be acted againſt by an equal height of water in the legs of the ſiphon; but if then you raiſe the iſſuing end of the ſiphon, now ſuppoſed at T, up to the level of *u* V above I H, the water will run back up from V to D, and ſo out at H, in the upper veſſel, becauſe then the column M S having only the height V D to ſuſtain, will be acted againſt with leſs force than the column K L, which is preſſed againſt by the whole height D H, ſuperior to V D. See the articles FLUID, ENGINE, AIR, &c.

Since the preſſure of the air is the cauſe of the water being puſhed up into the ſiphon, and the difference of its preſſure (as one column is acted againſt by the water in the ſhort leg more weakly than another column of air is acted upon by the water in the long leg) is the cauſe of its running continually from one veſſel into another, when once ſet agoing, it follows, that the bend D of the upper part of the ſiphon muſt not be above thirty-two feet higher than the water in the upper veſſel, becauſe the air cannot ſuſtain a column of water, whoſe height exceeds thirty-two feet. If therefore there was a crane, or ſiphon A C E D B (*ibid.* n° 2.) of about forty feet high, reckoning from A to E, with cocks A and B at its lower ends, and an hole at the top E, to be ſtopped with a cork upon occaſion, there might be made the following experiment; water being poured into the veſſels A and B, let the cocks A and B be ſhut, then with a funnel, pouring in water at E, till both legs of the ſiphon are full, ſtop the hole E, and open the two cocks at once. The water inſtead of running from the veſſel A into B, which it would do if the height C A was much under thirty-two feet, will in the two legs fall back to C and D thirty-two feet above A and B, where it will hang, the air not being able to ſuſtain the water above thoſe heights, and conſequently to drive

it

Fig. 1. Siphons

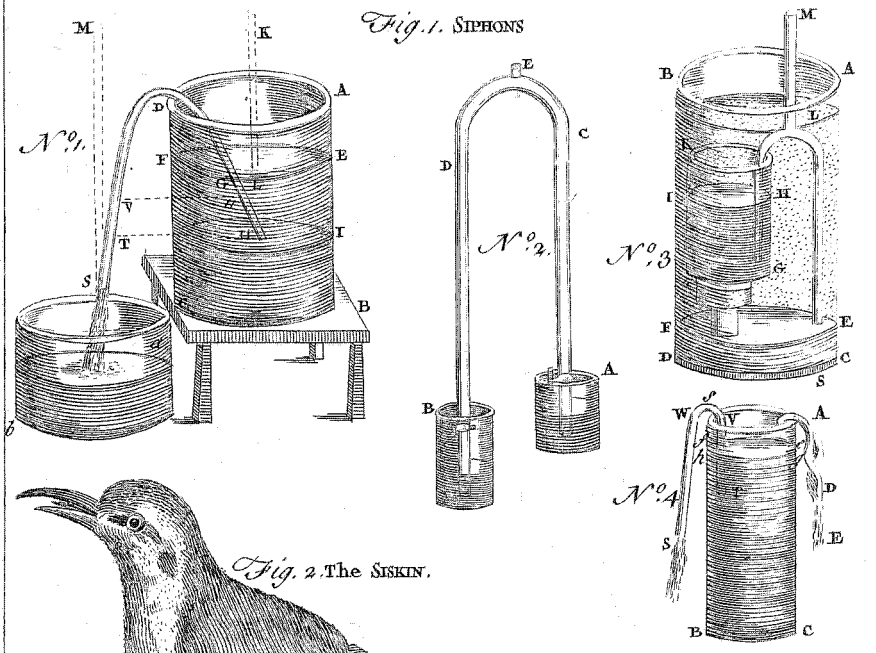


Fig. 2. The Siskin.

Fig. 3. Sitta.

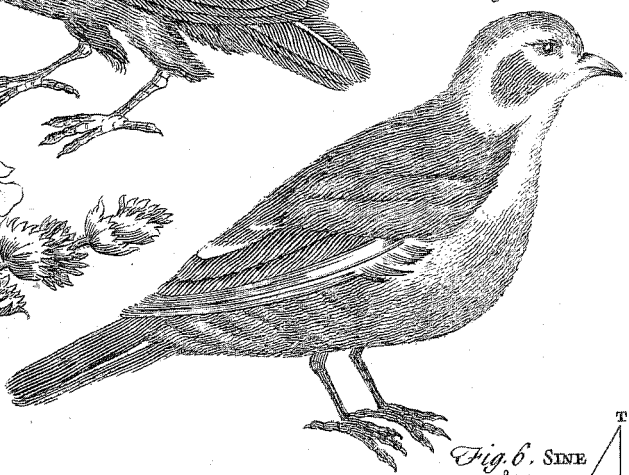


Fig. 4. Sideritis

Fig. 5. Sisymbrium

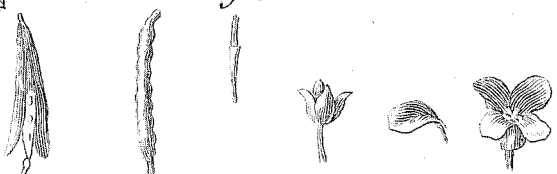
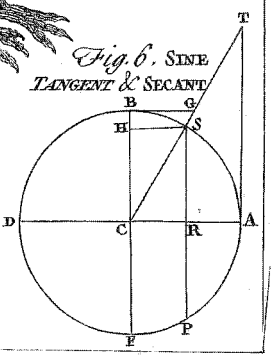


Fig. 6. Sine Tangent & Secant



T. Jefferys sculp.

drive it up over the bend E. Nay, unleſs the water be purged of air before the experiment, the top of the water at C and D will not be quite thirty feet above the water in the veſſels A and B, becauſe air will extricate itſelf out of the water, and getting into the cavity CED, preſs a little on the top of the water at C and D, ſo that its height will be leſs to ballance the preſſure of the atmoſphere. See the article ATMOSPHERE.

Mercury will run in a ſyphon in the ſame manner as water, but then the bend of the ſyphon muſt not be more than thirty inches and eight tenths above the ſtagnant mercury in the upper veſſel; becauſe, as it is near fourteen times ſpecifically heavier than water, it will be lifted up by the preſſure of the air but the fourteenth part that water is lifted.

To prove further, that a different preſſure againſt the orifices of the unequal legs of a ſiphon, is the cauſe of a liquor running thro' that inſtrument from a higher into a lower veſſel, we may make uſe of any other fluid, lighter than the fluid to be brought over, inſtead of air, and leave the bend of the ſiphon open to the air, as in the following experiment: ABCD, (*ibid.* n° 3.) is a pretty large glaſs jar with a little water (tinged red to make the experiment the more conſpicuous) in its bottom, to the height of an inch, as at EF. On a ſtand between F and G in the great jar, there is placed a little jar, GHKI, almoſt full of the ſaid red water: let down the ſiphon SLMG, open at S, M, and G, into the veſſel, ſo that the end S of the long leg ſtands in the water at the bottom of the great jar; and G, the end of the ſhort leg in the little jar, at the bottom of its water; pour in oil of turpentine into the great jar up to L, ſo that the water in the little jar may alſo be covered with it, and the water will firſt riſe up in both legs of the ſiphon, ſo as to meet at the bend L, then it will run out of the little jar into the great one through the ſiphon, in the direction GHLS, as long as there is any water in the little jar above G. See the article BAROMETER.

Inſtead of hanging a ſiphon over the ſide of a veſſel, it may be adapted to a cup; ſo that the ſhort leg being in the cup, the long leg may go down through the bottom of the cup; and then it is called Tantalus's cup. See the article TANTALUS.

There are ſome ſiphons through which the water will run out of a veſſel without ſucking the air from them, or making them in the manner of a waſte pipe: but theſe muſt be made of capillary tubes whoſe bore muſt not be bigger than one tenth of an inch; and as ſoon as they are put into a veſſel of water TsS (*ibid.* n° 4.) they will begin to run, and ſo continue as long as there is any water above the driving leg. This happens becauſe the attraction of coheſion, which makes water riſe up in ſmall tubes, draws the ſurface V to W in the ſiphon; where being lower than the ſurface of the water in the veſſel, it muſt run down; becauſe the column of water WS, is longer or higher than the column SV; and the air puſhing down at V, muſt overcome the reſiſtance of the air puſhing upwards at S. For the ſame reaſon, a piece of liſt of cloth, AD, will make the water come out of the veſſel and fall down in drops at E; as this piece of cloth is in effect a bundle of capillary ſiphons made by its interſtices. But if the ſurface of the water in the veſſel was at *g h*, the ſiphon being put in the water, would not run out, but only riſe in the ſiphon up to *ef*, the height to which a tube of that bore would raiſe the water by the attraction of coheſion. Whenever the veſſel is full, this experiment will ſucceed in vacuo. See the articles COHESION, CAPILLARY, *&c.*

SIPHONANTHUS, or SIPHONANTHEMUM, a genus of the *tetrandia-monogynia* claſs of plants, the corolla whereof conſiſts of a ſingle funnel-ſhaped petal: the fruit conſiſts of four roundiſh berries within a patulous cup: the ſeed is ſolitary and roundiſh.

SIRADIA, a city of great Poland, in the palatinate of that name, ſituated on the river Warta: eaſt long. 18°, north lat. 52°.

SIRANAGER, a city of hither India, capital of the province of Siba, ſituated on the river Ganges: eaſt long. 80°, north lat. 31° 30'.

SIRE, a title of honour in France, now given to the king only, as a mark of ſovereignty. In all placets and petitions, epiſtles, diſcourſes, *&c.* to the king, he is addreſſed under the title of ſire.

Sire was antiently uſed in the ſame ſenſe with ſieur and ſeigneur, and applied to barons, gentlemen, and citizens.

SIREN,

SIREN, σειρην, in antiquity, a kind of fabulous animal, otherwiſe called a mermaid. See MERMAID.

The ſirens are repreſented by Ovid, &c. as ſea-monſters, with womens faces and fiſhes tails; and by others decked with plumage of various colours. The three ſirens are ſuppoſed to be the three daughters of the river Achelous, and are called Parthenope, Ligea, and Leucoſia. Homer makes mention of only two ſirens, and ſome others reckon five. Virgil places them on rocks where veſſels are in danger of ſplitting. Some repreſent them as ſuch charming monſters, who ſung ſo harmoniouſly that ſailors were wrecked on their rocks without regret, and even expired in raptures.

SIRIK, or SERQUES, a town of Lorrain, ſituated on the Moſelle, twelve miles ſouth-eaſt of Luxemburg.

SIRIUS, the DOG-STAR, in aſtronomy, a very bright ſtar of the firſt magnitude, in the mouth of the conſtellation canis major. See the articles CANICULA and CANIS.

SIRMIUM, a city of Sclavonia, ſituated on the north ſide of the river Save: eaſt long. 20°. north lat. 45°.

SIRNAME. See the article SURNAME.

SISARUM, in botany, the ſame with ſium. See the article SIUM.

SISKIN, in ornithology, a ſpecies of the fringilla, with a ſpotted breaſt, of the bigneſs of the green-finch: the head is large and round: the iris of the eyes is hazel: the beak ſhort, conic and robuſt: the head black: the back tinged with green: the belly white, and wings elegantly variegated with a tranſverſe ſtreak of yellow. See plate CCL. fig. 2.

SISON, CORN-PARSLEY, or BISHOP'S-WEED, in botany, a genus of the *pentandria-digynia* claſs of plants, the general corolla whereof is uniform: the partial corolla is formed of five equal lanceolated inflex petals: there is no pericarpium: the naked fruit is oval, ſtriated, and ſeparable into two parts: the ſeeds are two, oval, convex, ſtriated on one ſide, and plane and ſmooth on the other. The ſeed of this plant is one of the four leſſer hot ſeeds of the ſhops, and is an attenuant, aperient and carminative. It is preſcribed in flatulencies and colics, and againſt obſtructions of the menſes; and is ſaid alſo to be a lithontriptic.

SISTERON, a city of France, in the province of Provence, ſituated on the river Durance: eaſt long. 5° 45′, north lat. 44° 16′.

SISTRUM, or CISTRUM, a kind of antient muſical inſtrument, uſed by the prieſts of Iſis and Oſiris. It is deſcribed by Spon as of an oval form, in manner of a racket, with three ſticks traverſing it breadth-wiſe, which playing freely by the agitation of the whole inſtrument, yielded a kind of ſound which to them ſeemed melodious. Mr. Malcolm takes the ſiſtrum to be no better than a kind of rattle. Oiſelius obſerves, that the ſiſtrum is found repreſented on ſeveral medals and on taliſmans.

SISYMBRIUM, WATER CRESS, in botany, a genus of the *tetradynamia-ſiliquoſa* claſs of plants, the corolla whereof conſiſts of four cruciform, oblong, erecto-patent petals, oftentimes leſs than the cup, with a great number of ungues: the fruit is a long, crooked, cylindrical pod, conſiſting of two valves, and containing two cells: the ſeeds are numerous and ſmall. See plate CCL. fig. 5.

The young leaves of this plant are frequently eaten in ſpring as a ſallad: the whole plant is of an acid taſte, and is a powerful attenuant and reſolvent. It is recommended as a kind of ſpecific in the ſcurvy, and is eaten in large quantities for that intention with great ſucceſs. It is good againſt obſtructions of the viſcera, and conſequently in jaundices, and many of the chronic diſeaſes. It is alſo a powerful diuretic, and promoter of the menſes: the beſt way of uſing it is in manner of a ſallad, or by drinking the expreſſed juice, which is at preſent much a cuſtom with us in ſpring with that of brook-lime, &c.

SISYRINCHIUM, in botany, a genus of the *gynandria-triandria* claſs of plants, the corolla whereof conſiſts of ſix oblong erecto-patent plane petals, rounded vertically with a point. The fruit is a triquetrous capſule, rounded vertically, conſiſting of three cells, and containing three valves: the ſeeds are numerous and roundiſh.

SISYRINCHIUM, is alſo the name whereby ſome authors call the plant iris. See the article IRIS.

SITE, or SCITE, *ſitus*, denotes the ſituation of an houſe, meſſuage, &c. and ſometimes the ground-plot, or ſpot of earth it ſtands on.

In logic, ſitus is one of the predicaments declaring a ſubject to be ſo and ſo placed: and in geometry and algebra, it denotes the ſituation of lines, ſurfaces, &c.

SITOPHYLAX, in grecian antiquity, an athenian magiſtrate, who had the ſuperintendance of the corn, and was to take care that nobody bought more than was neceſſary for the proviſion of his family. By the attic laws, particular perſons were prohibited buying more than fifty φορμαι, or meaſures of wheat a man; and the ſitophylax was to look to the obſervation of this law. It was a capital crime to prevaricate in it. There were fifteen of theſe officers, ten for the city and five for the pyræus.

SITTA, the NUTHATCH, in ornithology, the name of a diſtinct genus of birds, uſually confounded with the picæ. The beak of the ſitta is of a conic and ſomewhat cultrated form: the tongue is lacerated and emarginated: the feathers of the tail are rigid. The ſitta is of the ſize of our common goldfinch: the head is ſmall and depreſſed: the beak is ſhort, black on the upper part and white on the lower towards the throat: the head, neck, back, and wings, are grey: the breaſt of a pale yellow; and the lower part of the belly ſomewhat reddiſh. See pl. CCL. fig. 3.

SIUM, WATER-PARSNEP, SKIRRET, and NINZIN, in botany, a genus of the *pentandria-digynia* claſs of plants, the general corolla whereof is uniform: the partial one conſiſts of five inflex equal petals: the fruit is naked, and of an oval or roundiſh figure, ſmall, ſtriated, and ſeparable into two parts: the ſeeds are two, roundiſh, ſtriated, and convex on the one ſide, and plane on the other.

The leaves of this plant, eaten either crude or boiled, are ſaid to break and expel the ſtone; to excite urine and the menſes; to promote the expulſion of the fœtus, and to be good in a dyſentery.

SIXAIN, SIXTH, *ſexagena*, in war, an antient order of battle, wherein ſix battalions being ranged in one line, the ſecond and fifth were made to advance, to form the van-guard; the firſt and ſixth to retire, to form the rear-guard; the third and fourth remaining on the ſpot, to form the corps, or body, of the battle.

SIX-CLERKS. See CLERK.

SIXTH, *ſexta*, in muſic, one of the ſimple original concords, or harmonical intervals. See CONCORD.

The ſixth is of two kinds, greater and leſs, and therefore is eſteemed one of the imperfect concords, though each of them ariſe from a different diviſion of the octave: the greater ſixth is a concord reſulting from the mixture of the ſounds of two ſtrings, that are to each other as 3 : 5: the leſs from thoſe of two ſtrings, in the ratio of 5 : 8. See SCALE.

The leſs ſixth is compoſed diatonically of ſix degrees, whence its name, and five intervals, three whereof are tones, and two ſemi-tones; chromatically of eight ſemi-tones, five whereof are greater, and three leſs: it has its form, or origin, from the *ratio ſuper tri-partiens quinta*.

The greater ſixth is diatonically compoſed, like the other, of ſix degrees and five intervals, among which four are tones and one ſemi-tone; chromatically, of nine ſemi-tones, five whereof are greater, and four leſs; conſequently, it hath a leſs ſemi-tone more than the former. It has its origin from the *ratio ſuper bi-partiens tertia*. See the article PROPORTION.

Antiently the ſixth had only one duplicate, which was the thirteenth; but in the modern ſyſtem of muſic it has the twentieth for its triplicate, the twenty-ſeventh for its quadruplicate, &c. every one of which are indifferently marked in thorough baſs by the figure 6. And even the ſixth itſelf both greater and leſs, when natural, is not expreſſed any otherwiſe, than by a ſimple 6: but when it is greater or leſs, by accident, the characters of ſharp or flat are ſet along with the 6.

Beſides theſe two kinds of ſixths, which are both good concords, there are two others that are vicious and diſſonant; the firſt, called the defective ſixth, compoſed of two tones and three ſemi-tones, or of ſeven ſemi-tones, five of which are greater, and two leſs; the ſecond is the redundant ſixth, compoſed of four tones, a greater ſemi-tone and a leſs; whence ſome call it pentatonon, as comprehending five tones. Theſe two, being both diſſonant, ſhould never be uſed in melody, and very rarely in harmony.

As to the two conſonant ſixths, they were antiently uſed very ſparingly: at preſent they are allowed to be uſed as often as one pleaſes, as is the caſe with thirds; the ſixths being in reality no other

than inverted thirds: but care is uſually taken that the firſt ſixth that occurs be a leſs, the laſt a greater; and from the greater we riſe to the octave; and from the leſs, fall to the fifth.

SIZE, the name of an inſtrument uſed to find the bigneſs of fine round pearls withal. It conſiſts of thin pieces or leaves, about two inches long and half an inch broad, faſtened together at one end by a rivet. In each of theſe are round holes drilled of different diameters. Thoſe in the firſt leaf ſerve for meaſuring pearls from half a grain to ſeven grains; thoſe of the ſecond, for pearls from eight grains, or two carats, to five carats, &c. and thoſe of the third, for pearls from ſix carats and a half to eight carats and a half.

SIZE is alſo a ſort of paint, varniſh, or glue, uſed by painters, &c.

The ſhreds and parings of leather, parchment, or vellum, being boiled in water and ſtrained, make ſize. This ſubſtance is uſed in many trades. Mr. Boyle mentions, among other uſes, that fine red ſtands and hanging ſhelves are coloured with ground vermillion tempered with ſize, and when dry are laid over with common varniſh. There is alſo a ſize made of iſing-glaſs, in the ſame manner, and for the like purpoſes; but this ſize will not keep above three or four days, ſo that no more ſhould be made of it at once than preſent occaſion requires.

The manner of uſing ſize is to melt ſome of it over a gentle fire, and ſcraping as much whiting into it as may only colour it, let them be well incorporated together; after which you may whiten frames, &c. with it. After it dries, melt the ſize again, and put more whiting, and whiten the frames, &c. ſeven or eight times, letting it dry between each time: but before it is quite dry, between each waſhing, you muſt ſmooth and wet it over with a clean bruſh-pencil in fair water.

To make gold-ſize take gum animi and aſphaltum, of each one ounce; minium, litharge of gold, and umber, of each half an ounce; reduce all into a very fine powder, and add to them four ounces of linſeed-oil, and eight ounces of drying-oil; digeſt them over a gentle fire that does not flame, ſo that the mixture may only ſimmer, but not boil; for fear it ſhould run over and ſet the houſe a-fire, keep it conſtantly ſtirring with a ſtick till all the ingredients are diſſolved and incorporated, and do not leave off ſtirring it till it becomes thick and ropy; and being boiled enough, let it ſtand till it is almoſt cold, and then ſtrain it through a coarſe linnen-cloth and keep it for uſe.

To prepare it for working, put what quantity you may have occaſion to uſe in a horſe-muſcle ſhell, adding ſo much oil of turpentine as will diſſolve it, and making it as thin as the bottom of your ſeed-lac varniſh, hold it over a candle, and then ſtrain it through a linnen-rag into another ſhell; add to theſe ſo much vermilion as will make it of a darkiſh-red. if it is too thick for drawing, you may thin it with ſome oil of turpentine. The chief uſe of this ſize is for laying on metals.

The beſt gold-ſize for burniſhing is made as follows: take fine bole, what quantity you pleaſe, grind it finely on a marble, then ſcrape into it a little beef-ſuet; grind all well together; after which mix a ſmall proportion of parchment-ſize with a double proportion of water, and it is done.

To make ſilver-ſize: take tobacco-pipe clay, in fine powder, into which ſcrape ſome black-lead and a little Genoa-ſoap, and grind them all together with parchment-ſize, as already directed.

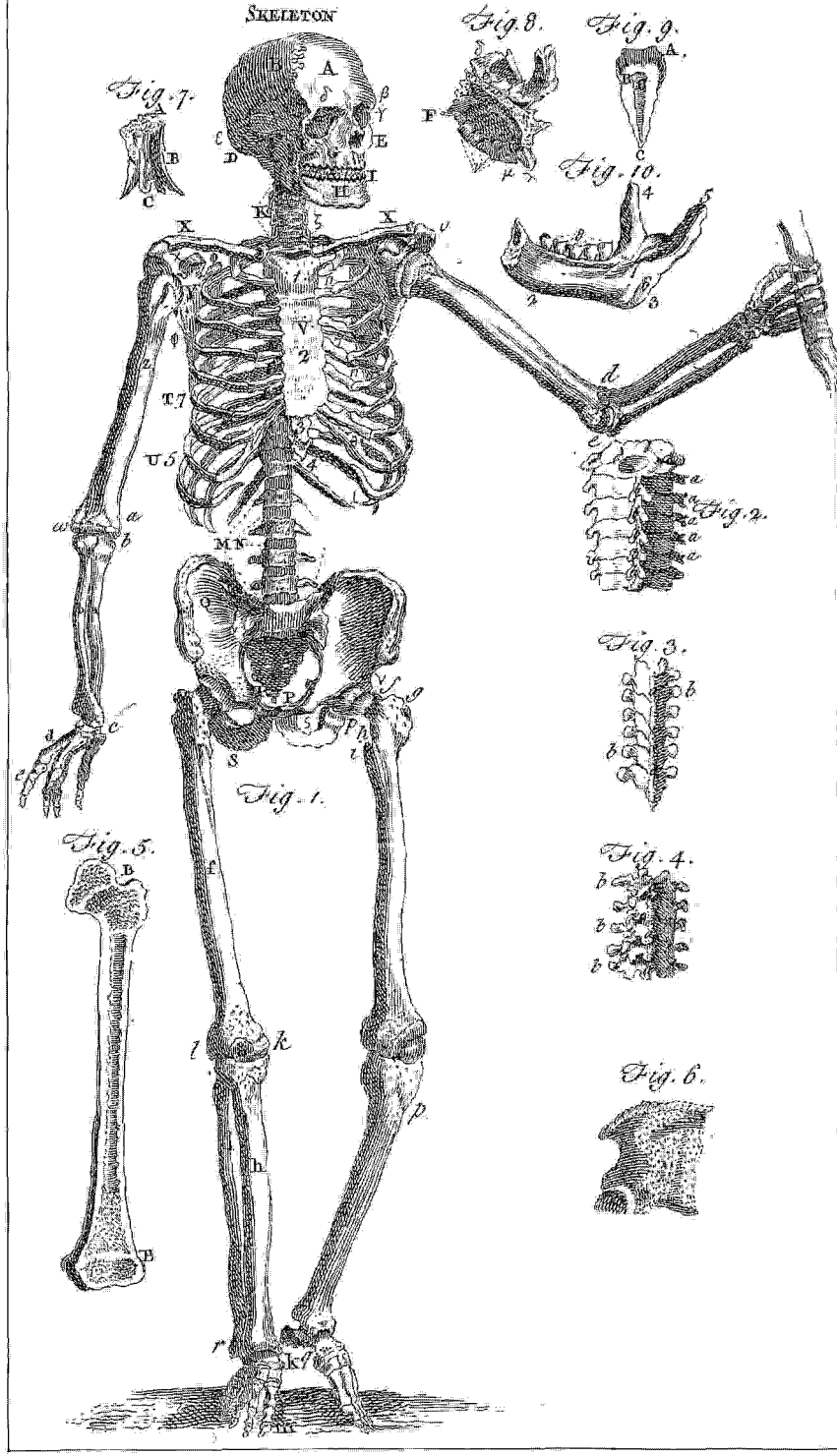
SIZYGY, or SYZYGY. See SYZYGY.

SKAITE, in ichthyology, the variegated raia, with the middle of the back ſmooth, and one row of ſpines on the tail. See the article RAIA.

This is one of the largeſt of the raia, growing to more than a yard in length, and its breadth equal to about three fourths of its length, and its thickneſs ſo conſiderable that it often weighs a hundred pounds: the back is ſomewhat gibboſe: the belly more flat: the colour is a pale grey, variegated with irregular ſpots of black: the roſtrum is long and ſub-acute: the eyes are large and prominent: there are two apertures, one behind each eye: the mouth is large and tranſverſe: the gills are ſmall, and run in two ſeries, five in each, down the breaſt: the lateral fins of the male fiſh have a great number of little ſpines on them, both on the upper and under ſides: theſe are not found in the female.

SKELETON, σκελετον, in anatomy, an aſſemblage or arrangement of all the bones

SKELETON



D. Jeffreys sculp

bones of a dead animal, dried, cleanſed, and diſpoſed in their natural ſituation, and kept in that order by means of wires, *&c.*

The ſkeleton of the human body being of great uſe in learning its oſteology, we have given a figure of it in plate CCLI. where fig. 1. is the entire ſkeleton of a man; A, the frontal bone; B, the parietal bone; C, the temporal bone; D, the occipital bone; E, the bones of the noſe; F, the os malarum; G, the ſuperior maxillary bone; H, the lower jaw; I, the teeth; K, the ſeven vertebræ of the neck, with their cartilages between them; L, L, L, *&c.* the twelve vertebræ of the back; M, the five vertebræ of the loins; N, the cartilages between the vertebræ of the loins; O, the os ſacrum; P, the os coccygis; Q, the os ilium; R, the os pubis; S, the os iſchium; T, the ſeven true ribs; U, the five falſe ribs; V, the ſternum; X, X, the clavicles; Y, the ſcapula; Z, the humerus, or arm-bone; a, the ulna; b, the radius; c, the carpus; d, the metacarpus; e, the phalanges digitorum; f, the thigh-hone, g, the rotula; h, the tibia; i, the fibula; k, the tarſus; l, the metatarſus; m, the phalanges of the toes; *a*, the head of the radius; *b*, the head of the ulna; *c*, the bones of the carpus; *d*, the lower appendix, which receives the head of the radius; *e*, the lower appendix, which receives the head of the ulna; *f*, the upper head of the os femoris, which is received into the acetabulum or coxendix; *g*, the outer trochanter; *i*, the trochanter minor; *k*, *l*, the two lower heads of the thigh-bone; *p*, the head of the tibia; *q*, the os calcis; *r*, the articulation of the fibula with the tibia.

Fig. 2. *ibid.* is a hind-view of the vertebræ of the neck; *a*, *a*, *a*, *&c.* being the tranverſe proceſſes, and *b*, *b*, *b*, *&c.* the ſpine or direct proceſſes.

Fig. 3. is a hind-view of the vertebræ of the back; *a*, *a*, *a*, being the ſpine or direct proceſſes, and *b*, *b*, *b*, the tranſverſe proceſſes.

Fig. 4. is a hind-view of the vertebræ of the loins, *a*, *a*, *a*, being the ſpine, and *b*, *b*, *b*, the tranſverſe proceſſes.

Fig. 5. is the thigh-bone ſawed longitudinally through the middle; B, B, being the union of the bone with its epiphyſis; and fig. 6. the marrow viewed with a microſcope.

Fig. 6. the os ilium ſawed through; by comparing which with fig. 5. the different internal ſtructure of round and broad bones is ſeen.

Fig. 7. A poſterior view of the two naſal bones; A, their ſuperior ſides; B, their exterior ſides; C, their inferior ſides.

Fig. 8. A view of the lower part and ſide next the noſe of the left os maxillare, with the palate-bone, and os turbinatum inferius; *γ*, the naſal proceſs; *δ*, the great tuber; *ε*, the palate-plate; *ζ*, the naſal ſpine; *η*, the orifice of the antrum maxillare; *ϰ*, the os ſpongioſum, or turbinatum inferius; *λ*, the two dentes inciſores; *μ*, the caninus; *ν*, the five dentes molares.

Fig. 9. A tooth cut perpendicularly, viewed with a microſcope; A, the fibres of the cortical part; B, the bony part; C, the entry at the point of the root to D, the channel for the nerve and blood-veſſels.

Fig. 10. A view of the ſurface next to the mouth of the right ſide of the lower jaw; 1, the ſubſtance in the middle of the chin; 2, the baſe of the jaw; 3, the angle; 4, the corone; 5, the condyle; 6, the rough print of the internal pterygoid muſcle; 7, the entry of the channel for the nerve and blood-veſſels; 8, the five grinders.

SKIE, one of the greateſt weſtern iſlands of Scotland, divided from the counties of Roſs and Inverneſs by a narrow channel; being upwards of ſixty miles in length and twenty in breadth.

SKIFF, or SQUIFF, the leaſt of two ſhip-boats, ſerving chiefly to go aſhore in, when the ſhip is in harbour.

SKIN, *cutis*, in anatomy. See the article CUTIS and CUTICULA.

SKIN, in commerce, is particularly uſed for the membrane ſtripped off the animal to be prepared by the tanner, ſkinner, currier, parchment-maker, *&c.* and converted into leather, *&c.* See the articles LEATHER, FURR, PARCHMENT, HIDE, *&c.*

Skins and the hair of beaſts manufactured become parchment and vellum; leather, of which are made ſhoes and boots, ſaddles, harneſſes, and furniture for horſes, gloves and garments, coaches and chairs, houſhold ſtuff, covers of books, drinking veſſels, *&c.* and furrs for cloathing, hats, caps *&c.* Theſe branches of trade that are derivable from

the ſkin trade, render it a very great mercantile concern, and well deſerving preſervation as much as we can within ourſelves. The Britiſh have greatly increaſed their quantity of furrs and ſkins of all ſorts from their northern colonies, ſince they planted northward towards Nova-ſcotia, Annapolis, and other places towards the river Canada.

The ſeveral ſorts of ſkins brought to Europe from thoſe parts are of the following kinds, *viz.* deer-ſkins, bear, beaver, otter, rackoon, fox, elk, cat, wolf, martin, mink, muſqueſh, fiſher, *&c.* Elk-ſkins, dreſſed or undreſſed, pay, on importation, 1 s. $5\frac{23\frac{1}{2}}{100}$ d. *per* ſkin; and draw back, on exportation, 1 s. $3\frac{52\frac{1}{2}}{100}$ d. and more, if dreſſed in oil, for every pound weight, on importation, 7 d. and draw back, on exportation, $4\frac{66\frac{2}{3}}{100}$ d. Fox-ſkins, the dozen, pay, on importation, 3 s. $9\frac{96}{100}$ d. and draw back, on exportation, 3 s. $5\frac{40}{100}$ d. and for every twenty ſhillings value, upon oath, on importation, pay 6 s. Goat-ſkins, in the hair, not otherwiſe rated, the dozen, pay, on importation, 4 s. $9\frac{45}{100}$ d. and draw back, on exportation, 4 s. $3\frac{75}{100}$ d. but thoſe of Ireland, the dozen, on importation, pay only 1 s. $7\frac{15}{100}$ d. and draw back, on exportation, 1 s. $5\frac{25}{100}$ d. and when tanned, the dozen, pay, on importation, 13 s. $6\frac{90}{100}$ d. and draw back, on exportation, 8 s. $7\frac{50}{100}$ d. Hare-ſkins, the dozen, pay, on importation, $9\frac{5\frac{3}{4}}{100}$ d. and draw back, on exportation, $8\frac{6\frac{1}{4}}{100}$ d. Kid-ſkins, in the hair, the hundred, pay, on importation, 17 s. $3\frac{45}{100}$ d. and draw back, on exportation, 4 s. $3\frac{75}{100}$ d. and for every twenty ſhillings value, upon oath, they pay 4 s. $9\frac{45}{100}$ d. and draw back, on exportation, 4 s. $3\frac{75}{100}$ d. Lamb-ſkins, dreſſed in alum, pay, the hundred, on importation, 4 s. $9\frac{45}{100}$ d. and draw back, on exportation, 4 s. $3\frac{75}{100}$ d. dreſſed in oil, every hundred, pay, on importation, 19 s. $1\frac{80}{100}$ d. and draw back, on exportation, 17 s. 3 d. undreſſed, in the wool, the hundred and twenty, pay, on importation, 2 s. $4\frac{27\frac{1}{2}}{100}$ d. and draw back, on exportation, 2 s. $1\frac{87\frac{1}{2}}{100}$ d. tanned, for every twenty ſhillings value, upon oath, the lamb-ſkins pay, on importation, 4 s. $9\frac{45}{100}$ d. and draw back, on exportation, 4 s. $3\frac{75}{100}$ d. Lion and panther-ſkins, undreſſed, the piece, pay, on imtation, 2 s. $4\frac{72\frac{1}{2}}{100}$ d. and draw back, on exportation, 2 s. $1\frac{87\frac{1}{2}}{100}$ d. and the mouſe-ſkins, and the pelts of goats, undreſſed, pay the ſame duties, both on importation and exportation, as the lion and panther-ſkins do. Seal-ſkins, on importation, pay, *per* ſkin, $4\frac{78\frac{3}{4}}{100}$ d. and draw back, on exportation, *per* ſkin, $4\frac{31\frac{1}{4}}{100}$ d. Shagreen-ſkins, each, on importation, pay $4\frac{78\frac{1}{4}}{100}$ d. and draw back, on exportation, $4\frac{31\frac{1}{4}}{100}$ d. Sheep-ſkins dreſſed, the dozen, pay, on importation, 1 s. $2\frac{36\frac{1}{4}}{100}$ d. and draw back, on exportation, 1 s. $\frac{93\frac{3}{4}}{100}$ d. Slink calf-ſkins, dreſſed with the hair on, the pound, pay, on importation, 2 d. and draws back, on exportation, $1\frac{33\frac{1}{3}}{100}$ d. and dreſſed without the hair, the pound, pay, on importation, 1 d. and draw back, on exportation, $\frac{66\frac{2}{3}}{100}$ d.

SKINNER, one who works in ſkins. Skinners, or fellmongers, ſhall not retain any journeyman, *&c.* to work in their trade, except they themſelves have ſerved ſeven years as apprentices thereto, on pain of forfeiting double the value of the wares wrought by ſuch perſons. 3 Jac. I. c. 9.

SKIPTON, a town in the weſt riding of Yorkſhire, ſituated thirty-five miles weſt of York.

SKIRMISH, in war, a diſorderly kind of combat, or encounter, in preſence of two armies, between ſmall parties, or perſons, who advance from the body for that purpoſe, and introduce to a general and regular fight.

SKULL, *cranium et calvaria*, in anatomy, that part of the head which forms its great bony cavity; and in a living ſubject contains the brain. See the articles HEAD and BRAIN.

The ſhape of the ſkull is oval; its exterior ſurface is convex; and its interior, concave: its round figure is an advantage to its capacity: it is a little depreſſed and longiſh, advancing out behind and flatted on the two ſides that form the temples, which contributes to the enlargement of the ſight and hearing: it is of unequal thickneſs in the ſeveral parts, and is compoſed of two lamellæ, or tables, an exterior and interior, laid or applied over each other, between which there is a diploë, or meditullium, being a thin ſpongious ſubſtance, made of bony fibres detached from each lamina, and full of little cells of different bigneſſes: the tables are hard and ſolid, the fibres being cloſe to one another: the diploë is ſoft, in regard the bony fibres are here at a greater diſtance; a contrivance whereby the ſkull is not only made lighter, but leſs liable to fractures: the external lamina is ſmooth and covered with the pericranium: the internal is likewiſe ſmoooth, abating the furrows made by the pulſation of the arteries of the dura mater before the cranium be arrived at its conſiſtence: it has ſeveral holes, through which it gives paſſage to the ſpinal marrow, nerves, arteries, and veins, for the conveyance and re-conveyance of the blood, &c. between the heart and the brain. See the articles DIPLOE, PERICRANIUM, DURA-MATER, &c.

The bones of the ſkull are eight, *viz.* the os frontis, the two parietal bones, the two bones of the temples, the occipital, the ſphenoides, and the ethmoides; each of which are deſcribed under their ſeveral names. See the articles FRONTIS, PARIETALIA, PETROSA, OCCIPITALIA, &c.

All the bones of the cranium are found to be imperfect in new-born infants: the ſinus and its meditullium are almoſt wholly wanting; the bony fibres in the formation of almoſt all of them, are carried in form of rays from a center towards the circumference; and moſt of them are not ſingle, as in adults, but compoſed each of ſeveral fruſtules, or little pieces; nor are the ſutures at that time formed, and frequently there are triquetrous little bones between them.

In adults the ſeveral bones of the ſkull are in general joined by ſutures: theſe ſutures are either common or proper; the proper ſutures are diſtinguiſhed into the true and the falſe or ſpurious; they are called true ſutures when the bones are joined together by means of a multitude of unequal denticulated eminences, forming an appearance ſomewhat like the edge of a ſaw: theſe denticulations enter mutually into each others ſinuſes, and on the outſide are moſt plainly viſible: of this kind are thoſe called the coronal, ſagittal and lambdoidal ſutures. The falſe or ſpurious ſutures, are thoſe ſquamoſe ones of the temporal and parietal bones, and of the os frontis and ſphenoides, in the angle where they unite with the parietal ones. The common ſutures are the tranverſal one which joins the os frontis with the bones below it, the ſphenoidal, the ethmoidal, and the zygomatic; but theſe are of little moment. Some authors mention the having met with ſkulls in which there were no ſutures at all. Between the ſutures, particularly the lambdoidal and ſagittal, there are found, in many ſkulls, certain ſmall bones; theſe are called, by ſome, oſſa triquetra, from their figure; by others, oſſa wormiana: they are uncertain in their figures and ſituation, and are joined to the others by ſutures: theſe bones are by ſome eſteemed a great medicine in epilepſies.

The uſe of the ſutures is, 1. That the dura mater may in thoſe parts be very firmly joined to the cranium and pericranium. 2. That, in infants, the head may the more eaſily be extended in its growth from the ſeveral bones being at that period diſunited at theſe places. 3. That the tranſpiration from the brain may be the more free and eaſy at that time of life in which they are open, and at which alſo the habit is more humid. 4. That very large fractures of the ſkull might in ſome meaſure be prevented: and finally, there is another advantage in their openneſs in children; namely, that medicinal applications to the external part of the head may penetrate and do ſervice.

The foramina in the cranium are numerous, and their uſes important: theſe are divided into the external and internal; by the external are meant thoſe which are eaſily diſcovered on the external ſurface of the ſkull; and by the internal are meant thoſe which are moſt obvious in the

the internal ſurface: of the larger internal foramina we count eleven pair, affording paſſage to the arteries, veins, and nerves of the brain; beſides theſe, we are to remark one which is ſingle, namely, the great foramen of the occipital bone, that gives paſſage to the medulla ſpinalis, and with it to the acceſſory ſpinal nerves, and to the vertebral arteries. Particular regard is to be had to the firſt pair of theſe foramina, (which may indeed be more properly called a congeries of the foramina of the os cribroſum) theſe give paſſage to the filaments of the firſt pair of nerves, called the olfactory nerves: the ſecond pair are in the ſphenoidal bones, and give paſſage to the optic nerves: the third pair are called the unequal and lacerated foramina, and give paſſage to the third and fourth pair of the nerves, to the firſt branch of the fifth pair, and to the ſixth pair; as alſo to the emiſſary of the receptacles of the dura mater: the fourth pair are in the ſphenoidal bone, and give paſſage to the ſecond branch of the fifth pair of nerves, which is diſtributed to the ſeveral parts of the upper jaw: the fifth, or oval foramina, give paſſage to the third branch of the fifth pair, and to the emiſſary of the dura mater: the ſixth is a very ſmall foramen, and admits of an artery, which is diſtributed over the dura mater, and is that which forms the impreſſions of little ſhrubs or trees on the parietal bones: the ſeventh is placed between the ſella equina and the petroſe apophyſis, and it tranſmits no veſſels, but is ſhut up by the dura mater: the eighth pair of foramina give paſſage to the carotid arteries, whence it is called the carotic foramen; and the intercoſtal nerve has its egreſs alſo at this opening: thro' the ninth, which is in the os petroſum, paſſes the auditory nerve: through the tenth, which is between the os petroſum and the occipital bone, paſs the par vagum and the lateral ſinuſes of the dura mater, together with the ſpinal nerve: the eleventh is in the os occipitis, near the edge of the foramen magnum; and through this paſs the ninth pair of nerves, called the linguale. See NERVE, *&c.*

Beſides theſe foramina, there are a number of little ones in the os petroſum, often very viſible; one of theſe carries back a branch of the auditory nerve to the dura mater; and the other principal one tranſmits the ſanguiferous veſſels to the labyrinth, or the internal organ of hearing. See the article EAR.

Of the external foramina, there are two proper ones of the os frontis, a little above the orbits; theſe are, from their ſituation, called ſupraorbitalia: they give paſſage to the ophthalmic nerve of Willis. Beſides theſe, there are four other foramina common to the os frontis, and to the plane or papyraceous bones of the orbit; two of theſe are placed on each ſide, and they tranſmit little nerves and veſſels to the ſinus of the ethmoidal bone. In the parietal bone there is one, which ſerves for the paſſage of a vein from the cutis of the cranium into the ſagittal ſinus of the dura mater, or from the ſagittal ſinus to the external veins of the head; but this is often wanting. In each of the oſſa temporum there are three common foramina; the firſt of theſe is the foramen jugale, which ſerves for the paſſage of the crotaphite-muſcle; the ſecond is large, in which is the ſinus of the jugular vein; and the third is the ductus Euſtachii, ſituated between the petroſum and the ſphenoides, and leading from the mouth into the internal ear. Beſides theſe common foramina of the oſſa temporum, there are alſo three proper ones: 1. The meatus auditorius. 2. The aquæduct of Fallopius, ſituated between the maſtoide and ſtyloide proceſs, and tranſmitting the hard portion of the auditory nerve. 3. A foramen behind the maſtoide proceſs, ſerving for the ingreſs of a vein into the lateral ſinus, or for the egreſs of one from the lateral ſinus into the veins of the occiput. In the occipital bone there are two foramina, ſituated behind the condyloide apophyſes, and ſerving to give paſſage to the vertebral veins, into the lateral ſinuſes of the dura mater: theſe, however, are wanting in many ſkulls. In the ſphenoides, beſides the internal ones already deſcribed, are the apertures of the ſinuſes into the noſtrils, common to them with the bones of the palate, and which are the apertures of the nares and fauces: there is another canal in the upper part of the pterygoide proceſſes, ſerving for the paſſage of the novum emiſſarium of the of the dura mater. In the os ethmoides there are, 1. Thoſe common to this bone with the os frontis, ſituated in the interior ſide of the orbit, and already deſcribed. And, 2. The apertures of the ethmoidal ſinuſes into the noſtrils. In the examination of different ſkulls, other foramina, beſides theſe, will occaſionally be found in different places; but theſe are either extraordinary and luſus naturæ, as

is often the caſe; or they are otherwiſe ſuch as ſerve only to give paſſage to veſſels ſerving for the nutrition of the bones in which they ſtand.

For the foramina of the maxillary bones, ſee the article MAXILLÆ.

For a view of the human ſkull, ſee the article SKELETON.

For the method of treating fiſſures, &c. of the ſkull, ſee the articles FISSURE, CONTRA-FISSURE, EXTRAVASATION, FRACTURE, &c.

For the treatment of depreſſions of the ſkull, ſee the articles TREPANNING and ELEVATORY.

Concealed injuries and wounds of the SKULL. When a blunt inſtrument is the occaſion of any injury of the cranium, if the injured part does not ſufficiently appear of itſelf, great induſtry is neceſſary to diſcover it. Where the common integuments appear tumid and ſoft, they are in this caſe to be divided to the bone; but in making the inciſion, care muſt be taken not to lay too much ſtreſs upon the knife, leſt ſplinters of the fractured cranium ſhould, by that means, be forced upon the brain. The beſt way to make this inciſion, according to Heiſter, is in form of the letter X, and about an inch and half in length, lifting up the ſkin at each angle, and leaving the bone bare. The blood that is ſpilt, may be taken up by a ſponge, and dry lint ſtuffed between the ſkin and the cranium: and having thus found out the injured part of the cranium, the trepan is to be applied, if it be found neceſſary. If ſplinters of the bone are now found, they muſt be removed either with the fingers or forceps, or, when they hang to the pericranium, with ſciſſars; but when they adhere pretty firmly to the neighbouring parts of the cranium, it is more adviſeable to replace them, than to endeavour to remove them by violence.

In wounds of the cranium, or ſkull, the firſt buſineſs is to find whether they are terminated in the external parts of the cranium, or whether they penetrate into its cavity: this is to be known, 1. By the eye. 2. By the probe; which, however, muſt be gently uſed here, for fear of bringing on farther miſchief. 3. By examining the inſtrument with which the blow was given, and conſidering the degree of force with which it was impelled. And, laſtly, the preſence or abſence of very bad ſymptoms; for a violent blow upon the head will always be attended with vomitings and vertigos, and blood will be diſcharged from the noſe, ears, and mouth, and the wounded perſon will loſe his ſpeech and ſenſes. Theſe diſorders will appear, ſometimes ſooner and ſometimes later, but are always moſt violent, when the wound is by a fall, or by ſome blunt inſtrument; in which caſes the cranium is uſually much ſhattered. The blood which diſcharges itſelf by the wound, that is made by a ſharp inſtrument, will inſinuate itſelf between the common integuments and the cranium: in the contuſions that are made with blunt inſtruments, ſometimes it will be concealed under the cranium; and, by corrupting the perioſteum and the cranium, will bring on ulcers and caries of the bone, and frequently occaſions fevers, convulſions, and death. See the articles CONTUSION, EXTRAVASATION, CARIES, &c.

SKY, the blue expanſe of air and atmoſphere. See the articles AIR, ÆTHER, and ATMOSPHERE.

The azure colour of the ſky ſir Iſaac Newton attributes to vapours, beginning to condenſe there, and which have got conſiſtence enough to reflect the moſt reflexible rays. M. De la Hire attributes it to our viewing a black object, *viz.* the dark ſpace beyond the regions of the atmoſphere, through a white or lucid one, *viz.* the air illumined by the ſun; a mixture of black and white always appearing blue. See COLOUR.

SLAB, an outſide ſappy plank or board ſawed off from the ſides of a timber-tree: the word is alſo uſed for a flat piece of marble.

SLANEY, a city of Bohemia, ſituated eighteen miles north-weſt of Prague.

SLATE, *ſtegania*, in the hiſtory of foſſils, a ſtone of a compact texture and laminated ſtructure, ſplitting into fine plates.

Dr. Hill diſtinguiſhes four ſpecies of ſtegania: 1. The whitiſh ſteganium, being a ſoft, friable, flaty ſtone, of a tolerably fine and cloſe texture, conſiderably heavy, perfectly dull and deſtitute of brightneſs, variegated with a pale brown, or browniſh yellow: this ſpecies is very common in many counties in England, lying near the ſurface of the ground; it is generally very full of perpendicular as well as horizontal cavities, many of which are filled up with a ſpar a little purer and more cryſtalline than the reſt, and is commonly uſed for covering houſes. 2. The red ſteganium is a very fine and elegant ſlate, of a ſmooth

ſurface,

ſurface, firm and compact texture, conſiderably heavy, and of a very beautiful pale purple, glittering all over with ſmall gloſſy ſpangles: it is compoſed of a multitude of very thin plates or flakes, laid cloſely and evenly over one another, and cohering pretty firmly: this is very common in the northern parts of England, and is much valued as a ſtrong and beautiful covering for houſes. 3. The common blue ſteganium is very well known, as an uſeful and valuable ſtone, of a fine ſmooth texture and gloſſy ſurface, moderately heavy, and of a pale greyiſh blue; compoſed of a multitude of even plates, laid cloſe upon one another, and eaſily ſplitting at the commiſſures of them: this is alſo very common in the north parts of England, and is uſed in moſt places for the covering of houſes. There are other ſpecies of this ſlate, *viz.* the browniſh blue friable ſteganium, uſually called coal-ſlate; the greyiſh black friable ſteganium, commonly called ſhiver; and the greyiſh blue ſparkling ſteganium. 4. The friable, aluminous, black ſteganium, being the iriſh ſlate of the ſhops: this is compoſed of a multitude of thin flakes, laid very evenly and regularly over one another, and ſplits very readily at the commiſſures of them. It is common in many parts of Ireland, and is found in ſome places in England, always lying near the ſurface, in very thick ſtrata. In medicine it is uſed in hæmorrhages of all kinds with ſucceſs, and is taken often as a good medicine in fevers.

There is a ſort of ſlate-ſtones called, by Dr. Hill, ammoſchiſta: of this kind there are only two ſpecies: 1. That compoſed only of ſparry and cryſtalline particles; or the grey, friable, dull ammoſchiſtum; being a coarſe, harſh, and rough ſtone, of a very looſe texture, conſiderably heavy; and compoſed of a large, coarſe, obtuſely angular gritt, ſurrounded, and in part held together, by a looſe earthy ſpar. This ſtone is very common in moſt countries, and is frequently uſed to cover houſes, inſtead of tiles: it bears the weather but badly, and is apt to crumble after froſts. 2. That compoſed of talcy, ſparry, and cryſtalline particles. This comprehends five ſpecies, *viz.* the browniſh white glittering ammoſchiſtum; the greeniſh grey ſhining ammoſchiſtum; the yellowiſh grey glittering ammoſchiſtum; the hard purple and white laminated ammoſchiſtum; and the bluiſh glittering ſlate-ſtone. Theſe ſorts of ſtate-ſtone are very common in the northern countries, and are uſed for covering houſes, paving, building, *&c.*

SLAVE, a perſon in the abſolute power of a maſter, either by war or conqueſt. We find no mention of ſlaves before the deluge; but immediately after, *viz.* in the curſe of Canaan: whence it is eaſily inferred, that ſervitude increaſed ſoon after that time; for in Abraham's time we find it generally eſtabliſhed. Some will have it to commence under Nimrod, becauſe it was he who firſt began to make war, and of conſequence to make captives; and to bring ſuch as he took, either in battles or irruptions, into ſlavery. Among the Romans, when a ſlave was ſet at liberty, he changed his name into a ſurname, and took the nomen or prænomen of his maſter; to which he added the cognomen he had been called by, when a ſlave. Great part of the roman wealth conſiſted in ſlaves: they had the power of life and death over them, which no other nation had; but this ſeverity was afterwards moderated by the laws of the emperors. The ſlaves were eſteemed the proper goods of their maſters, and all they got belonged to them; but if the maſter was too cruel in his correction, he was obliged to ſell his ſlave at a moderate price. The Romans not only approved of, but even invented, new manners of making ſlaves; for inſtance, a man born free among them might ſell his freedom and become a ſlave. There were generally three ways of obtaining ſlaves; either when they bought them with the booty taken from the enemy, diſtinct from the ſhare reſerved for the public; or of thoſe who took them priſoners in war; or of merchants who dealt in them, and ſold them at fairs.

Slavery is abſolutely aboliſhed in Britain and France, as to perſonal ſervitude. Slaves make a conſiderable article of the traffic in America. The engliſh ſouth-ſea company have, by treaty, the ſole privilege of furniſhing the ſpaniſh Weſt-indies with ſlaves. See NEGRO.

For an account of the Lacedemonian ſlaves, ſee the article HELOTS.

For the cuſtom of marking or ſtigmatizing ſlaves, ſee STIGMATIZING.

SLAUGHTER. See the articles MANSLAUGHTER, HOMICIDE, MURDER, BUTCHER, *&c.*

Slaughter-ſkins is a term uſed by our curriers and leather-dreſſers, for the ſkins of oxen or other beaſts, when freſh and co-

vered with the hair; ſuch as they receive them from the ſlaughter-houſes, where the butchers flea the carcaſs.

SLEDGE, a kind of carriage without wheels, for the conveyance of very weighty things, as huge ſtones, &c.

This is alſo the name of a large ſmith's hammer, to be uſed with both hands. Of this there are two ſorts; the uphand-ſledge, which is uſed by under-workmen, when the work is not of the larger ſort; it is uſed with both the hands before, and they ſeldom raiſe it higher than their head; but the other, which is called the about-ſledge, and which is uſed for battering or drawing out the largeſt work, is held by the handle with both hands, and ſwung round over their heads at their arm's end, to ſtrike as hard a blow as they can.

SLEEP is defined to be that ſtate wherein the body appearing perfectly at reſt, external objects move the organs of ſenſe as uſual, without exciting the uſual ſenſations. Sleep, according to Rohault, conſiſts in a ſcarcity of ſpirits, which occaſions that the orifices or pores of the nerves in the brain, whereby the ſpirits uſed to flow into the nerves, being no longer kept open by the frequency of the ſpirits, ſhut up of themſelves. For, this being ſuppoſed, as ſoon as the ſpirits, now in the nerves, ſhall be diſſipated, the capillaments of thoſe nerves, having no ſupplement of new ſpirits, will become lax, and cohere as if cemented together, and ſo be unfit to convey an impreſſion to the brain: beſides, the muſcles being now void of ſpirits, will be unable to move, or even to ſuſtain the members; thus will ſenſation and motion be for the time deſtroyed. See WATCHING.

Sleep is broken off unnaturally, when any of the organs of ſenſation is ſo briſkly acted on, that the action is propagated to the brain; for upon this, the new ſpirits remaining in the brain, are all called together, and unite their forces to unlock the pores of the nerves, &c. But if no object ſhould thus affect the organ, yet ſleep would in ſome time be broken off naturally; for the quantity of ſpirits generated in ſleep, will at length be ſo great, that ſtretching out the orifices of the nerves, they will open themſelves a paſſage. See the articles ANIMAL SPIRITS, CIRCULATION, &c.

With regard to medicine, ſleep is defined by Boerhaave, to be that ſtate of the medulla of the brain, wherein the nerves do not receive ſo copious nor ſo forcible an influx of ſpirits upon the brain, as is required to enable the organs of ſenſe and voluntary motion, to perform their functions. Sleep being one of the non-naturals, it is not poſſible for thoſe to preſerve their health, who do not go to ſleep in a regular manner; for ſleep repairs the ſpirits, which are diſſipated by watching; and conſequently it reſtores the ſtrength of thoſe who are weak, indiſpoſed, or labour much. It likewiſe promotes perſpiration, contributes greatly to digeſtion, and more to nutrition. The night is the moſt proper for ſleep; for the vigour of the mind and body are better reſtored in the night than in the day; thus nocturnal labour and lucubrations impair the health. A ſound undiſturbed ſleep is much the beſt: unquiet interrupted ſleep contributes little to reſtore the ſtrength, and hinders perſpiration and digeſtion. Exerciſe and cuſtom ought to regulate the duration of ſleep: ſix or ſeven hours at a time is generally thought to be ſufficient; for too much ſleep makes a perſon ſluggiſh, heavy, dulls the faculties, and renders them unfit for buſineſs. Immoderate watching is as prejudicial to health, as ſleep is beneficial: it may occaſion great diſorders in the animal œconomy, by waſting the ſpirits, and more fluid parts of the blood. The beſt place for ſleep, is a dry ſpacious room, where the air is good; for cloſe, little, moiſt places, too much heated, are bad. The beſt poſture, is to lie on the right ſide at night, and on the left in the morning, with the head raiſed and the body bent. See REGIMEN, &c.

Some of the more extraordinary phænomena of ſleep, yet to be accounted for, are, that when the head is hot, and the feet cold, ſleep is impracticable; that ſpirituous liquors firſt bring on drunkenneſs, and then ſleep; that perſpiration in time of ſleep is twice as great as at other times; that upon ſleeping too long, the head grows heavy, the ſenſes dull, the memory weak, with a coldneſs, pituitouſneſs, an indiſpoſition of the muſcles for motion, and a want of perſpiration; that much ſleeping will ſuſtain life a long time, without either meat or drink; that upon a laudable ſleep, there always follows an expanſion of all the muſcles, frequently a repeated yawning, and the muſcles and nerves acquire a new agility; that fœtuſes always ſleep, children often, youth more than grown perſons, and they more than old perſons; and that people

recovering from violent diſtempers ſleep much more than when in perfect health. For the ſleepy diſeaſes, ſee the articles CARUS, COMA-VIGIL, COMA-SOMNOLENTUM, LETHARGY, *&c.*

SLEEPER, or the GREAT SLEEPER, in zoology, the hairy-tailed mus with red feet. See the article MUS.

This is of the ſize of the rat, but more corpulent; the head is ſhort and thick; the opening of the mouth ſmall; the noſtrils fleſh coloured; the eyes large, black, and prominent; and the ears large and naked. This is frequent in many parts of Europe, and retires in winter into caverns under the ground, where it carries however a conſiderable ſtore of nuts and other fruits.

SLEEPERS, in natural hiſtory, a name given to ſome animals, which are ſaid to ſleep all the winter; ſuch as bears, marmotes, dormice, bats, hedge-hogs, ſwallows, *&c.* We are told, in Med. Eſſays of Edinb. that theſe do not feed in winter, have no ſenſible evacuations, breathe little or none at all, and that moſt of the viſcera ceaſe from their functions. Some of theſe creatures ſeem to be dead, and others to return to a ſtate like that of the fœtus before the birth: in this condition they continue, till by length of time maturating the proceſs, or by new heat, the fluids are attenuated, the ſolids ſtimulated, and the functions begin where they left off.

SLEEPERS, in the glaſs-trade, are the large iron-bars croſſing the ſmaller ones, and hindering the paſſage of the coals, but leaving room for the aſhes.

SLEEPERS, in a ſhip, timbers lying before and aft, in the bottom of the ſhip, as the rung-heads do the lowermoſt of them is bolted to the rung-heads, and the uppermoſt to the futtocks and rungs.

SLESWICK, the capital of the dutchy of Sleſwick, otherwiſe called ſouth Jutland, ſituated on the river Sley: eaſt longit. 9° 45′, and north lat. 54° 45′. See the article JUTLAND.

SLIDING, in mechanics, is when the ſame point of a body, moving along a ſurface, deſcribes a line on that ſurface.

For the ſliding-rule as variouſly contrived by Everard, Coggeſhal, Gunter, Hunt, and Partridge, ſee the article RULE.

SLIGO, a county of Ireland, in the province of Connaught, bounded by the ocean on the north, by Letrim on the eaſt, by Roſcommon, on the ſouth, and by Mayo on the weſt.

SLING, *funda*, an inſtrument ſerving for caſting ſtones with great violence. The inhabitants of the Balearic iſlands were famous in antiquity, for the dexterous management of the ſling: it is ſaid they bore three kinds of ſlings, ſome longer, others ſhorter, which they uſed according as their enemies were either nearer or more remote. It is added, that the firſt ſerved them for a head-band, the ſecond for a girdle, and that the third they conſtantly carried with them in the hand.

SLINGING is uſed variouſly at ſea, but chiefly for the hoiſting up caſks, or other heavy things, with ſlings, *i. e.* contrivances of ropes ſpliced into themſelves, at either end, with one eye big enough to receive the caſk, or other thing, to be ſlung.

SLIPPING, among gardeners, the tearing off a ſprig from a branch, or a branch from an arm of the tree. Theſe ſort of ſlips take root more readily than cuttings.

SLOANEA, or SLOANA, in botany, a genus of the *polyandria-monogynia* claſs of plants, having no corolla but the calyx, which is ſometimes taken for one; the fruit is a large, roundiſh, echinated capſule, formed of four valves; the ſeeds are oval, obtuſe, fleſhy, and have long nuclei.

SLOATH, or SLOTH, *bradypus*, in zoology. See the article BRADYPUS.

The face of the ſloath is covered with hair; the claws are of a ſubulated form; there are no ears, nor are there any middle teeth. This is a very extraordinry animal, both in figure and qualities. It is hard to ſay to what other it is equal in ſize, ſince it is like none in ſhape; the length of the body is about a foot, and when well fed its thickneſs is equal to its length; the feet are flatted or plain, in the manner of thoſe of the bear or monkey, but are extremely narrow; the claws are very long and ſharp; the head is ſmall and round; and the face ſomething reſembling that of the monkey; the colour of the whole animal is a pale greyiſh brown. It is the ſloweſt mover of all the quadrupeds; the traverſing the ſpace of fifty yards is the labour of a day for it: it is uſually ſeen on the tops of tall trees, for ſecurity.

SLOATS *of a cart*, the under-pieces which keep the bottom of the cart together. See the article CART.

SLOE, *prunus ſylveſtris*, the engliſh name for the wild plum. See PRUNUS.

SLONIM,

SLONIM, a city of Poland, in the province of Lithuania, and palatinate of Novogrodeck, ſituated in eaſt lon. 25°, and north lat. 53°.

SLOOP, a ſort of floating veſſel, otherwiſe called ſhallop. In our navy, ſloops are tenders on the men of war, and are uſually of about ſixty tons, and carry about thirty men. See SHIP.

SLOOT, or SLOTEN, a town of the united Netherlands in the province of Frieſland, ſituated twenty-one miles ſouth of Lewarden.

SLOT, among ſportſmen. Drawing on the ſlot, ſee the article DRAWING.

SLOTH, or SLOATH. See SLOATH.

SLOUGH, a deep muddy place. The caſt ſkin of a ſnake, the damp of a coal-pit, and the ſcar of a wound, are alſo called by the ſame appellation. The ſlough of a wild boar is the bed, ſoil, or mire, wherein he wallows, or in which he lies in the day-time.

SLOUTH, or SLOUGHT, in hunting, is uſed for a company of ſome ſorts of wild beaſts, as a ſlouth of bears.

SLOW-WORM, in zoology, the engliſh name for a ſpecies of anguis. See the article ANGUIS.

SLUCZK, the capital of the palatinate of the ſame name, in the dutchy of Lithuania and kingdom of Poland, ſituated in eaſt long. 27°, and north lat. 53°.

SLUICE, in hydraulics, a frame of timber, ſtone, earth, &c. ſerving to retain and raiſe the water of the ſea, a river, &c. and on occaſion to let it paſs: ſuch is the ſluice of a mill, which ſtops and collects the water of a rivulet, &c. in order to diſcharge it at length, in greater plenty, upon the mill-wheel: ſuch alſo are thoſe uſed in drains, to diſcharge water off lands; and ſuch are the ſluices of Flanders, &c. which ſerve to prevent the waters of the ſea overflowing the lower lands, except when there is occaſion to drown them.

Sometimes there is a canal between two gates or ſluices, in artificial navigation, to ſave the water, and render the paſſage of boats equally eaſy and ſafe, upwards and downwards; as in the ſluices of Briare, in France, which are a kind of maſſive walls, built parallel to each other at the diſtance of twenty or twenty-four feet, cloſed with ſtrong gates at each end, between which is a kind of canal or chamber, conſiderably longer than broad, wherein a veſſel being incloſed, the water is let out at the firſt gate, by which the veſſel is raiſed fifteen or ſixteen feet, and paſſed out of this canal into another much higher. By ſuch means a boat is conveyed out of the Loire into the Seyne, though the ground between them riſe above one hundred and fifty feet higher than either of thoſe rivers.

Conſtruction of SLUICES. The conſtruction of ſluices ought to be conducted by an able engineer, who is well acquainted with the action of fluids in general; and particularly with the ſituation of the place, the nature of the ſoil, &c. where the ſluice is to be erected: if on the ſea-ſhore, he ought to be perfectly well acquainted with the effects of the ſea on that coaſt, and the ſeaſons when it is calm or ſtormy, that he may be able to prevent the fatal accidents thence ariſing: and, if in a river, it is neceſſary to know whether it uſually overflows its banks, and at what ſeaſons of the year its waters are higheſt and loweſt. The machines for driving the piles ſhould be placed about forty yards from the ſide of the ſluice, above and below it. As to the depth of ſluices, it muſt be regulated by the uſes for which they are deſigned; thus, if a ſluice is to be erected at the entrance of a baſon for ſhipping, its depth muſt correſpond with the draught of water of the largeſt ſhip that may, at any time, have occaſion to enter thereby. The rule uſually obſerved, is to make the ſurface of the bottom of the canal on a level with the low-water-mark: but if the bottom or the harbour and canal be ſuch, as to be capable of becoming deeper by the action of the water, Belidor very juſtly obſerves, that the bottom of the ſluice-work ſhould be made deeper than either.

When a ſluice is to be placed at the bottom of an harbour, in order to waſh away the filth that may gather in it, by means of the waters of a river or canal, in this caſe the bottom of the ſluice-work ſhould be two feet or eighteen inches higher than the bottom of the harbour, that the water may run with the greater violence.

An engineer ought always to have in his view, that the faults committed in the conſtruction of ſluices are almoſt always irreparable. We ſhall therefore lay down ſome rules, from Belidor, for avoiding any overſights of this kind: 1. In order to adjuſt the level of the ſluice-work with the utmoſt exactneſs, the engineer ought to determine how much deeper it muſt be than a fixed point: and this he ſhould mark down in his draught, in the moſt

preciſe terms poſſible. 2. When the proper depth is ſettled, the foundation is next to be examined; and here the engineer cannot be too cautious, leſt the apparent goodneſs of the ſoil deceive him: if the foundation is judged bad, or inſufficient to bear the ſuperſtructure, it muſt be ſecured by driving piles, or a grate-work of carpentry. 3. There ſhould be engines enough provided for draining the water; and theſe ſhould be entirely under the direction of the engineer, who is to take care that they be ſo placed as not to be an obſtacle to the work; and alſo cauſe proper trenches to be cut, to convey the water clear off from the foundation. 4. When the ſluice is to be built in a place where the workmen will be unavoidably incommoded by the waters of the ſea, *&c.* all the ſtones for the maſon-work, as well as the timbers for that of carpentry, ſhould be prepared beforehand; ſo that when a proper ſeaſon offers for beginning the work, there remains nothing to be done, but to fix every thing in its place. 5. In order to ſhew the ſtate of the work, an exact journal ſhould be kept of the materials employed, to be ſigned every week by the chief engineer and undertaker; obſerving to diſtinguiſh the different pieces of materials, and the places where they were employed. 6. When an undertaker is found, who is not only able to be at the expence of providing all the materials, but likewiſe vigilant and active to execute whatever is judged neceſſary for the perfection of the work, it would be the worſt of policy to give the preference to others, who, through ignorance, or diſhoneſty, bring in eſtimates lower than it is poſſible to execute the work as it ought. However, that the conditions of the contract may be properly executed, the chief engineer, or other perſons of unqueſtionable underſtanding and honeſty, commiſſioned for that purpoſe, ſhould take care that able workmen be employed, and that they execute their ſeveral parts in a proper manner.

Sluices are made different ways, according to the uſes they are intended for: when they ſerve for navigation, they are ſhut with two gates, preſenting an angle towards the ſtream; but when made near the ſea, there are two pair of gates, one to keep the water out, and the other to keep it in, as occaſion requires: the pair of gates next the ſea preſent an angle that way, and the other pair the contrary way; the ſpace incloſed by theſe gates is called a chamber.

When ſluices are deſigned to detain the water in ſome parts of the ditch of a fortreſs, they are made with ſhutters to ſlide up and down in grooves; and when they are made to cauſe an inundation, they are then ſhut by means of ſquare timbers let down into culliſes, ſo as to lie cloſe and firm.

Particular care muſt be taken, in the building of a ſluice, to lay the foundation in the ſecureſt manner poſſible; to lay the timber-grates and floors in ſuch a manner, that the water cannot penetrate through any part, otherwiſe it will undermine the work; and, laſtly, to make the grates of a proper ſtrength, in order to ſupport the preſſure of the water; and yet to uſe no more timber than is neceſſary.

As a general conſtruction is much preferable to a particular one, we ſhall here give the deſcription of a large ſluice, with two pair of gates, from Mr. Muller's Fortification; which may be adapted to any particular caſe, provided a proper allowance be made for the various circumſtances in regard to their uſe and ſituation, as already obſerved.

To conſtruct then the plan of a ſluice, ſuppoſe half its width, O C, (plate CCLII. fig. 1.) to be divided into ſix equal parts, or the whole breadth into twelve: theſe parts ſerve for a ſcale whereby the dimenſions of the ſeveral parts of the work are determined. Through the point O, draw the line A B at right angles to O C, and take O B = 30 of the above parts; or, which is the ſame, equal $2\frac{1}{2}$ the width: through the points A and B, draw the lines A R, B S, at right angles to A B; and let the lines paſſing through the point C, and parallel to A B, meet theſe laſt lines in M and Q: then, if M N and P Q be taken each equal to nine parts, and each of the lines M R and Q S equal to ſix, the lines N R and P S will determine the wings of the ſluice, and N P the body: and if the lines A R, B S, be produced, ſo that the parts R V and S T be each ſix parts, they will determine the faces.

The part of the length, O B, exceeds the other part, O A, by $\frac{1}{4}$ of the width; becauſe we ſuppoſe a turning bridge is to be placed on that ſide, for a communication from one ſide of the ſluice to the other: but when there is no occaſion for ſuch a bridge, O B is made equal to O A; and

Sluice

Scale
parts 20 15 10 5 4 3 2 1

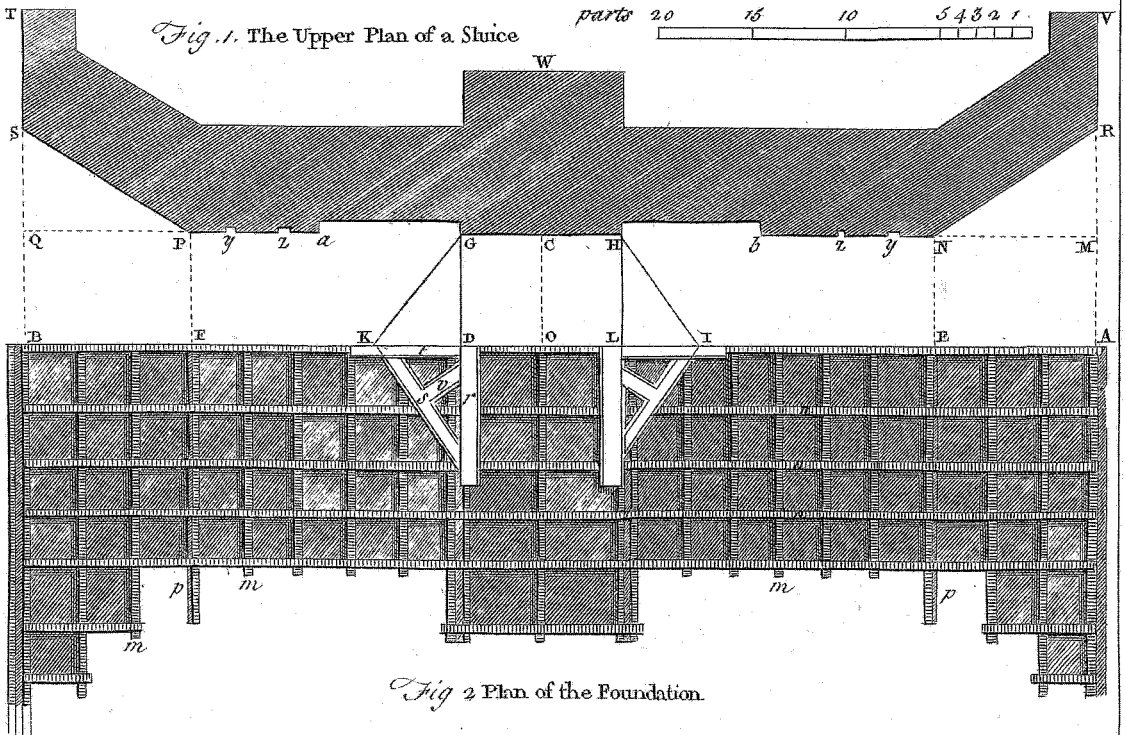


Fig. 1. The Upper Plan of a Sluice

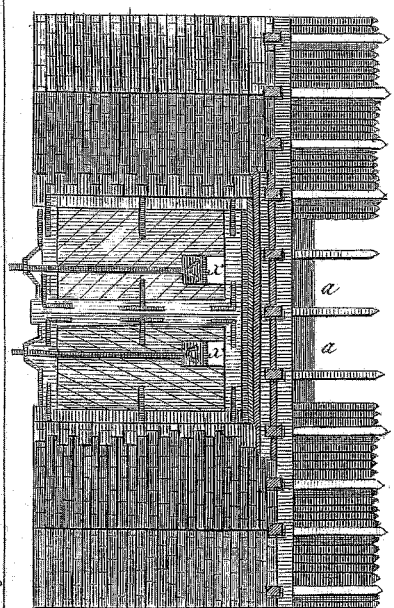


Fig. 3. Section Crofs-wise

Fig 2 Plan of the Foundation

T. Jefferys sculp.

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and then the whole length will be but four times and a half the width, which is, Mr. Belidor thinks, the beſt length for a great ſluice.

Next to determine the chamber, and the poſition of the gates, take OD and OL, each equal to four parts; and draw the lines DG and HL parallel to OC: then if the lines GK and HI be drawn, ſo as to make the angles DGK and LHI each $= 35^{\circ}\ 16'$, it will be the beſt poſition that can be given. The cavities x, y, are a foot each way in large ſluices, and but nine inches in middling ones: they ſerve for letting down ſquare timbers to form a batardeau on each ſide, in caſe the gates or floor want to be repaired.

The receſſes G a, H b, in the wall, are made to receive the gates when open; and are of ſuch a depth, that they may be fluſh with the wall, and not make that part narrower than the reſt of the ſluice.

The thickneſs of the wall from N to P is equal to $\frac{4}{5}$ of the depth of water; the parts RN and PS are $\frac{3}{5}$, and at V and T $\frac{2}{5}$. The counter-fort W is determined by producing the lines LH and DG, and projects beyond the wall by $\frac{1}{4}$ of the width of the ſluice.

As to the timber-grates under the floor and foundation (*ibid.* fig. 2.) if the foundation be bad, we ſuppoſe piles to be driven under the croſſings of the ſleepers m and the tie-beams n; and to prevent the water from getting under the foundation, fix rows of dove-tail piles are driven, *viz.* one at each end, one at each of the angles N and P, marked p (*ibid.* fig. 1. and 2.) and one on each ſide of the chamber: and it muſt be obſerved, that, excepting thoſe at the angles N and P, the reſt are all driven between two ſleepers in order to keep them tight and cloſe together. The ſleepers and tie-beams are partly let into each other, and bolted together. And as to the maſonry between the gratings, bricks are preferred to ſmall ſtones; as being much cloſer, and filling up every part more exactly: they are laid in terras-mortar, as well as the reſt of the foundation; and the whole is covered with a floor of three-inch thick oaken planks, laid lengthwiſe. This done, the frames made to ſupport the gates at the bottom, are laid in their proper places; which are compoſed of a cell r, two hurters s, two braces v, and a tong t. The cell enters about three feet into the ſide walls, and the ſockets to receive the pivots of the gates are placed in it; the tong ought to be ſo long as to croſs three ſleepers, to which it is ſtrongly faſtened; and the cell, tong, and hurters ought to have the ſame dimenſions; and their height muſt be ſuch as to be a foot above the laſt floor of the ſluice and chamber; for which reaſon, the piles under the chamber are left a foot higher than the reſt.

Over the firſt floor is placed another, compoſed of ſleepers and tie-beams, *&c.* anſwering exactly to thoſe underneath, and covered with ſtrong oaken planks, laid lengthwiſe and nailed to the ſleeps, as in the firſt floor. But upon the ſecond floor is laid another of only two-inch thick planks, which do not enter the wall, that they may be repaired when needful: this laſt floor may be made of yellow deal, and its ſeams muſt be well caulked, to prevent the water from making its way through them.

The walls muſt be made about three feet higher than the greateſt depth of the water; and the faces are formed of the largeſt ſtretchers and heads that can be had, laid in terras-mortar, and cramped together: but the reſt of the work may be done with good common mortar. The top of the wall muſt be covered with large flat ſtones or bricks laid in terras-mortar, to prevent the water from penetrating into the maſonry: and when all is finiſhed, a bed of clay ſhould be rammed againſt the wall, two feet thick, all round the outſide; beginning as low as the foundation, and raiſed as high as the wall.

To prevent the water from carrying off the earth, by its fall at the ends of the ſluice, a falſe floor of faſcines is made of as many fathoms long as the water in the ſluice is feet high: this falſe floor is faſtened with pickets upon an artificial bed of clay, nearly level with the floor of the ſluice; and above the faſcines is laid a pavement of hard ſtones well ſecured, ſo that the current may not tear them up. And for the greater ſecurity, a row of dove-tail piles is driven at each end: and it ought to be obſerved, that both floors, *viz.* that of the ſluices, and that above the faſcines, muſt have a gradual deſcent of about $\frac{1}{48}$ part of the length.

The croſs ſection (*ibid.* fig. 3.) ſhews the poſition of a row of piles, and the ſleepers above them, into which they are tenoned; alſo the heads of the tie-beams, the floor between them, the cell and

and the two floors above it: there is alſo ſeen a row of dove-tail piles, broken off in the middle, in order to ſee part of the maſonry *a*, *a*, between the piles, and under the ſleepers. The outſides of the gates are alſo ſeen in this ſection; alſo how the planks are joined to the frame, the ſhutters *x*, *x*, and the irons both of the gate and ſhutters.

In the conſtruction of gates, particular care ſhould be taken to join the ſeveral pieces together, in ſuch a manner, that the whole frame may be as ſtrong as poſſible, and yet not to make them more heavy than neceſſary. The principal parts of the frame of a gate are two ſtiles or uprights; that which is next to the wall, and to which the pivots are fixed, being called the pivot-poſt, and the other the chamfered ſtile, from being edged off ſo as to make a plain joint with the other gate. The other pieces, which cannot be ſeen in this ſection, conſiſt of ſeveral rails, placed not nearer to each other than twenty-four inches, nor farther than thirty; and of ſeveral braces, which form the ſame angle with the pivot-poſt, as the joints of the planks on the outſide.

As it would be too tedious to calculate the proper ſtrength of each piece, we ſhall give their dimenſions from Mr. Belidor, which, he ſays, were taken from thoſe moſt approved in practice. Suppoſing then the pieces of the principal frame to be the ſame, in the ſame ſluice, they will be as follows in different ſluices. In thoſe from 8 to 12 feet wide, the principal pieces ſhould be 8 inches thick, and 10 broad; the intermediate rails, 6 by 8; the braces and monions, or ſhort uprights to form the wickets, 4 by 6; and the whole covered by two-inch thick planks, as well as all the gates of ſluices under 37 feet wide. In ſluices from 13 to 18 feet wide, the principal pieces ſhould be 10 by 12 inches; the intermediate rails, 8 by 10; and the braces and monions, 4 by 6. In ſluices from 19 to 24 feet wide, the principal pieces ſhould be 12 by 14 inches; the intermediate rails, 10 by 12; and the braces and monions, 5 by 7. In ſluices from 25 to 30 feet wide, the principal pieces ſhould be 14 by 16; the intermediate rails, 12 by 13; and the braces and monions 6 by 8. In ſluices from 31 to 36 feet wide, the principal pieces ſhould be 15 by 17; the intermediate rails, 13 by 14; and the braces and monions, 7 by 9. In all ſluices from 37 to 42 feet wide, the principal pieces ſhould be 16 by 18; the rails, 14 by 16; and the braces and monions, 7 by 9. Laſtly, in all ſluices from 42 to 48 feet wide, the principal pieces ſhould be 18 by 20; the rails, 15 by 18; and the braces and monions, 8 by 10. However, it ought to be obſerved, that when the gates are very high, the middle rail is made of the ſame dimenſions with the principal pieces: alſo in ſluices above 36 feet wide, the planks of the gates muſt be $2\frac{1}{2}$ inches thick; or it may anſwer ſtill better, to lay two rows of plank of that thickneſs, in order that the ſeams of the under row may be covered by the planks of the upper one.

Thoſe who deſire to be more particularly informed of the manner of conducting theſe works, agreeably to their ſituation, uſes, and the nature of the ſoil where they are built, may conſult Belidor's Architecture Hydraulique, T. II. P. I. p. 134, ſeq. alſo Mr. Muller's Book, already mentioned, p. 287, ſeq.

SLUTTELBURG, a town of Ruſſia, in the province of Ingria, ſituated on the ſouth ſide of the lake Ladoga, in eaſt long. 31° 20′, north lat. 60°.

SLUYS, a port-town of dutch Flanders, ſituated oppoſite to the iſland of Cadſant: eaſt long. 3° 15′, north lat. 51° 18′.

SMACK, a ſmall veſſel with but one maſt. Sometimes they are employed as tenders on a man of war, and are uſed for fiſhing upon the coaſt, *&c.* See SHIP.

SMALLAGE, in botany, a ſpecies of apium. See the article APIUM.

Smallage has the leaves of the ſtalks wedge-like, and is called by authors apium paluſtre, paludapium, and eleoſelinum. It is aperient and diſcuſſive, and its root is one of the five great openers. It is very good in groſs conſtitutions, and infarctions of the lungs, eſpecially if eat with oil and muſtard. There needs no trouble to reduce it into any medicinal form, ſince it may be eaten ſo conveniently and agreeably in ſallads.

SMALAND, a province of Sweden, in the territory of Gothland, bounded by Eaſt Gothland, on the north; by the Baltic ſea, on the eaſt; by Blecking, on the ſouth; and by Halland, on the weſt.

SMALKALD, a town of Germany, in the landgraviate of Heſſe, ſituated ten miles ſouth of Saxgotha, near which are conſiderable iron-mines.

SMALT, a preparation of arſenic, made as follows: the remaining matter of the cobalt from which the flowers have been ſublimed being ſuffered to cool, and then taken out of the furnace, is reduced to fine powder, and calcined over again in the ſame furnace, and this repeated till there is not the leaſt particle of flame or ſmoke ſeen to ariſe from any part of it. The cobalt thus freed from its arſenical and ſulphureous part, is then ground to an impalpable powder, and a mixture is made of one hundred pound of this powder, fifty pounds of pure white pot-aſh, and a hundred and fifty pounds of pure white ſand; this is all ground together upon a mill, and then put into a proper furnace, like thoſe of our glaſs-houſes, where it runs into an elegant deep blue glaſs. This is afterwards ground to powder in mills for that purpoſe, and makes what we call ſmalt or powder-blue, uſed by our painters and waſherwomen. It has no uſe in medicine. See the article COBALT.

SMARAGDUS, the EMERALD, in natural hiſtory. See the article EMERALD.

SMARIS, in ichthyology, a ſpecies of the ſparus with a red ſpot in the middle of each ſide, and with the pectoral fins and tail red. See the article SPARUS.

SMATCH, a bird more uſually called oenanthe. See the article OENANTHE.

SMECTIS, a name by which ſome call fuller's earth. See the article FULLER.

SMELL, *odor*, with regard to the organ, is an impreſſion made on the noſe, by little particles continually exhaling from odorous bodies: with regard to the object, it is the figure and diſpoſition of odorous effluvia, which, ſticking on the organ, excite the ſenſe of ſmelling: and with regard to the ſoul, it is the perception of the impreſſion of the object on the organ, or the affection in the ſoul reſulting therefrom. See SENSE.

The principal organs of ſmelling are the noſtrils, and the olfactory nerves; the minute ramifications of which latter are deſcribed throughout the whole concave of the former. See the articles NOSE and NERVE.

According to Boerhaave, the act of ſmelling is performed by means of odorous effluvia floating in the air; being drawn into the noſtrils, in inſpiration, and ſtruck with ſuch force againſt the fibrillæ of the olfactory nerves, which the figure of the noſe, and the ſituation of the little bones, render oppoſite thereto, as to ſhake them, and give them a vibratory motion; which action, being communicated thence to the common ſenſory, occaſions an idea of a ſweet, or fœtid, or ſour, or an aromatic, or a putrified object, *&c.* The matter in animals, vegetables, foſſils, *&c.* which chiefly affects the ſenſe of ſmelling, Boerhaave obſerves, is that ſubtile ſubſtance inherent in the oily parts thereof, called ſpirit; for that, when this is taken away from the moſt fragrant bodies, what remains has ſcarce any ſmell at all; but this, poured on the moſt inodorous bodies, gives them a fragrancy.

Willis obſerves, that brutes have, generally, the ſenſe of ſmelling in much greater perfection than man; and by this alone, they diſtinguiſh the virtues and qualities of bodies unknown before; hunt out their food at a great diſtance, as hounds, and birds of prey; or hid among other matters, as ducks, *&c.* Man having other means of judging of his food, *&c.* did not need ſo much ſagacity in his noſe; yet have we inſtances of a great deal, even in man. In the Hiſtoire des Antilles, we are aſſured, there are negroes who, by the ſmelling alone, can diſtinguiſh between the footſteps of a Frenchman and a negro.

The chemiſts teach, that ſulphur is the principle of all ſmells, and that thoſe are more or leſs ſtrong, as the ſulphur in the odorous body is more or leſs dried or exalted. Sulphur, they ſay, is the foundation of odours, as ſalt is of ſavours, and mercury of colours. See the article SULPHUR, *&c.*

Smell, like taſte, conſiſts altogether in the arrangement, compoſition, and figure of the parts, as appears from the following experiments of Mr. Boyle. 1. From a mixture of two bodies, each whereof is of itſelf void of ſmell, a very urinous ſmell may be drawn, that is, by grinding of quick lime with ſal ammoniac. 2. By the admixture of common water, which, of itſelf, is void of all ſmell, or inodorous; another inodorous body may be made to emit a very rank ſmell. Thus camphor, diſſolved in oil of vitriol, is inodorous, yet, mixed with water, immediately exhales a very ſtrong ſmell. 3. Compound bodies may emit ſmells which have no ſimilitude to the ſmell of the ſimples they conſiſt of. Thus oil of turpentine, mixed with a double quantity of oil of vitriol, and diſtilled; after diſtillation, there is no ſmell but of ſulphur, and what is left behind, the retort being

being again urged by a more violent fire, yields a ſmell like oil of wax. 4. Several ſmells are only to be drawn forth by motion and agitation. Thus glaſs, ſtones, &c. which even when heated yield no ſmell, yet, when rubbed and agitated in a peculiar manner, emit a ſtrong ſmell; particularly beech-wood, in turning, yields a kind of roſy ſmell. 5. A body that has a ſtrong ſmell, by being mixed with an inodorous one, may ceaſe to have any ſmell at all. Thus if aqua fortis, not well dephlegmated, be poured on ſalt of tartar, till it ceaſes to ferment, the liquor when evaporated will yield inodorous cryſtals, much reſembling ſalt of nitre; yet when burnt, will yield a moſt noiſome ſmell. 6. From a mixture of two bodies, one whereof ſmells extremely ill, and the other not well, a very pleaſant aromatic odour may by gained, *viz.* by a mixture of aqua fortis, or ſpirit of nitre, with an inflammable ſpirit of wine. 7. Spirits of wine, by mixing with an almoſt inodorous body, may gain a very pleaſant aromatic ſmell. Thus inflammable ſpirits of wine, and oil of Dantzic vitriol, mixed in equal portions, then digeſted, and at laſt diſtilled, yield a ſpirit of a very fragrant ſmell. 8. A moſt fragrant body may degenerate into a fœtid one, without the admixture of any other body. Thus, if the ſpirit mentioned in the former experiment be kept in a well cloſed receiver, it will ſoon turn to the rankneſs of garlic. 9. From two bodies, one whereof is inodorous and the other fœtid, a very pleaſant ſmell may ariſe, much reſembling muſk, &c. by putting pearls into ſpirit of vitriol; for, when diſſolved, they yield a very agreeable ſmell.

SMELT, in ichthyology, the oſmerus with ſeventeen rays in the pinna ani. This is a beautiful little fiſh; its length is five or ſix inches, and its breadth not great in proportion, but the thickneſs is conſiderable: the head is of an oblong figure, and ſomewhat acute; the opening of the mouth is large, the back is convex, and the belly ſomewhat flat; the lower jaw is a little longer than the upper; the noſtrils ſtand in the middle between the eyes and the extremity of the roſtrum; they have each two apertures; the eyes are large and round, the pupil is black, and the iris of a ſilvery white, but tinged a little with blue towards the upper part.

SMELTING, in metallurgy, the fuſion or melting of the ores of metals, in order to ſeparate the metalline part from the earthy, ſtony, and other parts. See the articles FUSION, ORE, FLUX, GOLD, SILVER, &c.

SMEW, in ornithology, a name uſed in ſome parts of the kingdom for the common mergus. See the article MERGUS.

SMILACIS SPECIES, in botany, the name by which Tournefort calls a ſpecies of convallaria. See CONVALLARIA.

SMILAX, PRICKLY BINDWEED, in botany, a genus of the *dioecia-hexandria* claſs of plants, without any flower-petals: its fruit is a bilocular berry, with two ſeeds in each cell.

SMIRIS, in natural hiſtory, the ſame with emery. See the article EMERY.

SMITHERY, or SMITHING, a manual art, by which an irregular lump of iron is wrought into an intended ſhape.

The utenſils, tools, and operations of this art either have been, or will be, deſcribed under their reſpective articles FORGE, ANVIL, HAMMER, TONGS, VICE, FILING, CASE-HARDENING, NEALING, SOLDERING, &c.

In the annexed plate (CCLIII.) fig. 1. repreſents the ſmith's forge and bellows; fig. 2. the anvil ſet in a wooden block, its face being A, and B its beak or beak-iron, corruptly called bickern; fig. 3. and 4. two kinds of tongs, where A, A are the chaps, B the joint, and C, C the handles; fig. 5. repreſents two kinds of hammer, of which A is the face, B the pen, C the eye, and D the handle; fig. 6. is the vice, of which A, A are the chaps, C the ſcrew-pin, D the nut, E the ſpring, and F the foot; G is a hand-vice; and H, H the pliers; fig. 7. is the ſcrew-plate and its tap; and fig. 8. a drill.

Theſe are the moſt eſſential tools uſed in the black-ſmith's trade; however, as ſome kinds of work require different tools, we ſhall here deſcribe a machine for iron-work. AB (plate CCLIV.) is called the ſlitting-mill, CD the plate-mill, and SP the clipping-mill. E and F are two great water-wheels, ſo diſpoſed that when the water has paſſed the wheel E in the direction QW, it comes about the wheel F in the direction XY. The water-wheel E, with the lantern G on the ſame axis, carries the ſpur-wheels, or cog-wheels, H, M, with the cylinders B and D: and the wheel F, with the lantern I, carries the cog-wheels K, N, with the

SMITHERY

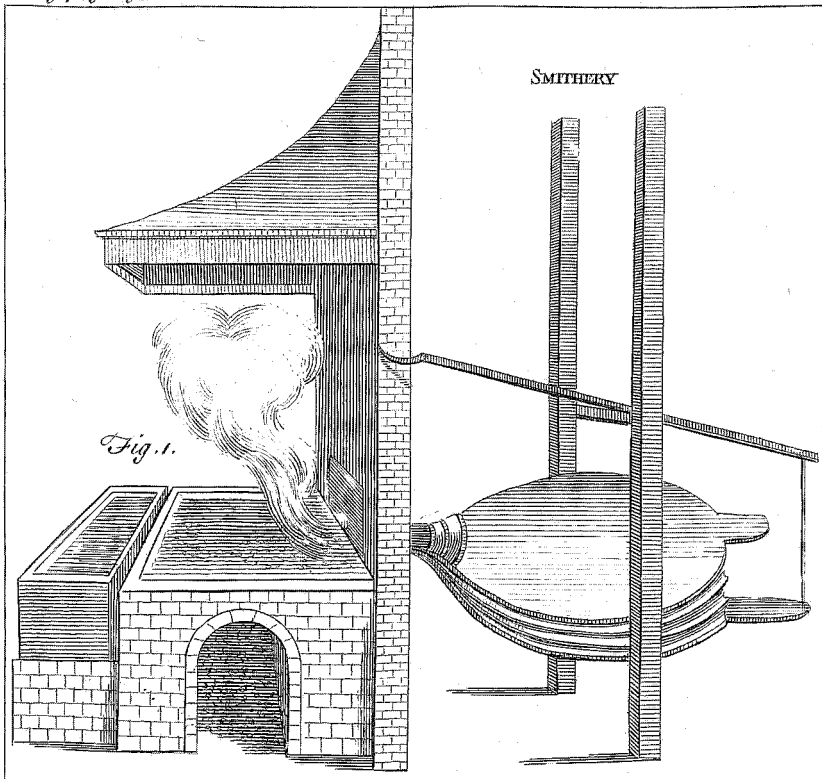


Fig. 1.

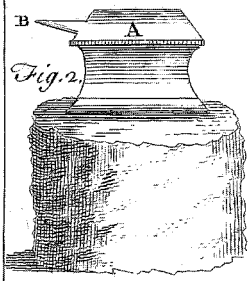


Fig. 2.

Fig. 3.

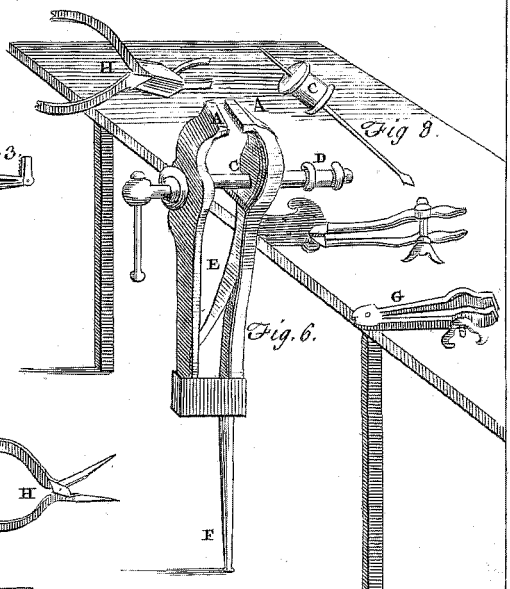


Fig. 8.

Fig. 6.

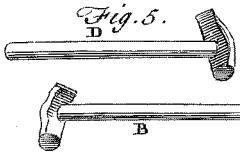
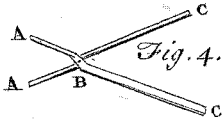


Fig. 5.



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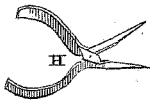


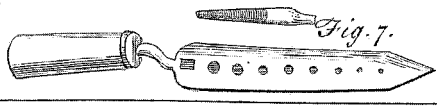


Fig. 7.

T. Jefferys sculp

A Machine used in SMITHERY for making and Slitting Iron-Plates

T. Jefferys sculp.

Fig. 1. A Smoke-Jack

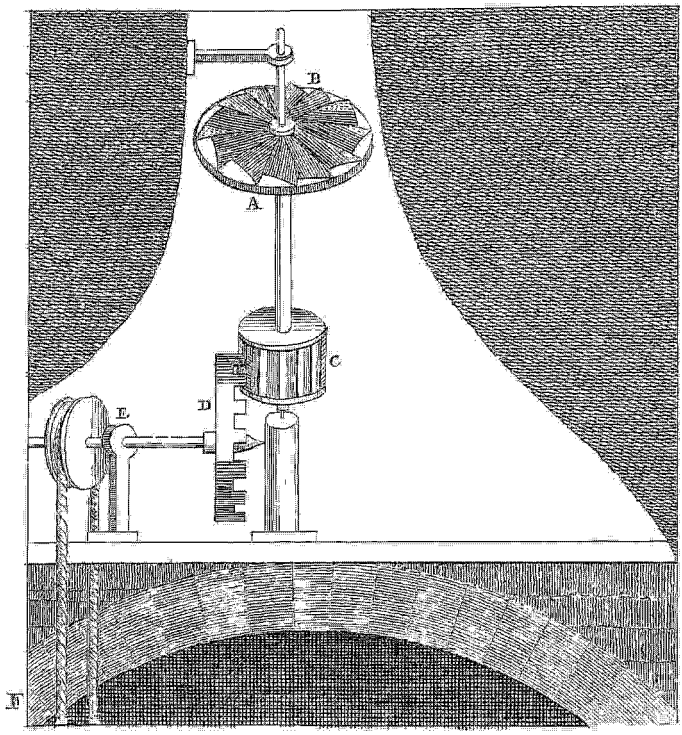


Fig. 2. Snails

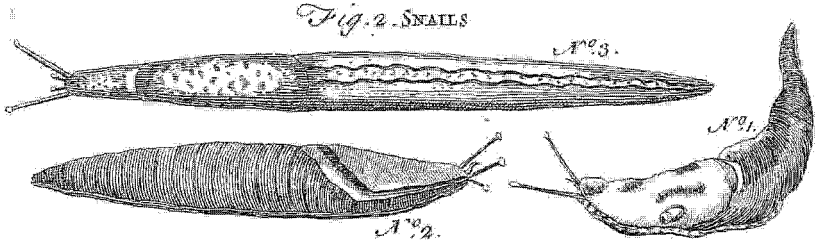
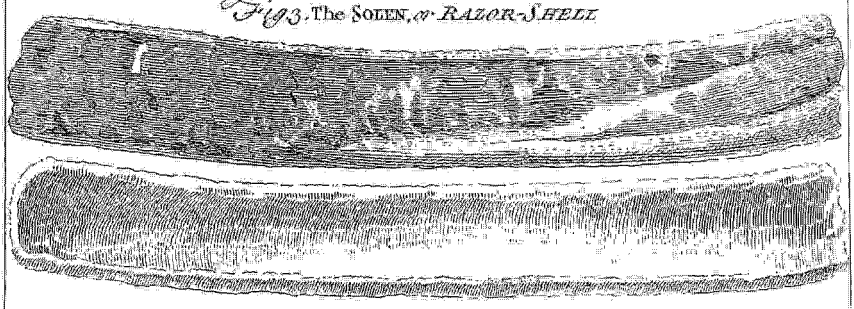


Fig 3. The Solen, or Razor-Shell



the cylinders A and C. Now the cylinders A and B, as alſo C and D, turn contrary ways about; the cylinders A and B are cut into teeth for ſlitting iron-bars, and are about twelve inches in diameter, whereas C and D are only eight inches in diameter. Theſe cylinders may be taken out, and others put in at pleaſure; they may alſo be brought nearer to, or removed farther from, each other, by means of ſcrews which ſcrew up the ſockets where their axles turn. The axles of N, I, K, lie all in one horizontal plane; and ſo do thoſe of M, G, H: but the cylinders A and B, as alſo C and D, lie one above another.

In order to make iron-plates, if a bar of iron be heated and made thin at the end, and that end put in between the cylinders C and D, whilſt the mill is going, the motion of the cylinders will draw it through, on the other ſide, into a thin plate. Likewiſe, if a bar of iron be heated and thinned at the end, and put in between the toothed cylinders A and B, it will be drawn through on the other ſide, and ſlit into ſeveral ſmall pieces, or ſtrings; and then, if there be occaſion, any of theſe ſtrings may be drawn through the plate-mill with the ſame heat, and faſhioned into plates.

In the clipping-mill, OPQ (*ibid.*) is the ſheers for clipping bars of cold iron; V, a cog in the axis of the water-wheel; OP, one ſide of the ſheers made of ſteel, and moveable about P. The plane LPR is perpendicular to the horizon. When the mill goes, the cog V raiſes the ſide OP, which as it riſes, clips the bar TQ into two, by the edges SP and RP.

The whole of this engine, except the water-wheels, is within the houſe.

SMOKE, or SMOAK, *fumus*, an humid matter, exhaled in the form of vapour, by the action of fire or heat. See the articles FIRE, HEAT, and EXHALATION.

A ſmoke-jack (plate CCLV. fig. 1.) is a very ſimple and commodious machine, in a kitchen; ſo called from its being moved by means of the ſmoke, or rarified air, moving up the chimney, and ſtriking againſt the tail of the horizontal wheel, AB; which being inclined to the horizon, is thereby moved about the axis of the wheel, together with the pinion C, which carries the wheel D and E; and E carries the chain F, which turns the ſpit.

The wheel AB ſhould be placed in the narrow part of the chimney, where the motion of the ſmoke is ſwifteſt, and the greateſt part of it muſt ſtrike upon the ſails. The force of this machine is ſo much greater, as the fire is greater.

SMOKE-SILVER, and SMOKE-PENNY, a payment made to the miniſters of ſeveral pariſhes in lieu of tithe-wood.

SMOLENSKO, the capital of a province of the ſame name, in Muſcovy, ſituated on the confines of Poland, in eaſt long. 33°, and north lat. 56°.

SMUGGLERS, in law, thoſe perſons who conceal or run prohibited goods, or goods that have not paid his majeſty's cuſtoms. See DUTY, CUSTOMS, *&c.*

SMUT, in huſbandry, a diſeaſe in corn, when the grains, inſtead of being filled with flour, are full of a ſtinking black powder.

As to the cauſe of this diſtemperature, ſome have attributed it to exceſſive rankneſs, or fatneſs of the ſoil; to the manuring the land with rotten vegetables, and to the ſowing ſmutty ſeed. Mr. Bradley thinks it is owing to the ſame cauſe with a blight, *viz.* to multitudes of inſects. But Mr. Tull is convinced, from experiment, that it is cauſed by too much moiſture; for planting ſeveral plants of corn in troughs of very moiſt earth, they all produced ſmutty ears, while very few ſuch were found in the field, from whence theſe plants were taken.

There are two remedies for the ſmut, recommended by writers on huſbandry, *viz.* ſteeping the ſeed in ſalt brine, and changing the ſeed. See the articles SEED and CHANGE.

As to the ſteeping of ſeed, when wheat is intended for drilling, it muſt be ſoaked in a brine of pure ſalt, diſſolved in water, ſince urine is found to be highly prejudicial. The moſt expeditious way of brining wheat for drilling, is to lay it in a heap, and waſh it with a ſtrong brine ſprinkled on it, ſtirring it up with a ſhovel, that it may be all equally brined, or wetted with it; after this, ſift on ſome fine lime all over the ſurface, and ſtir it up, ſtill ſifting on more in the ſame manner till the whole is duſted with the lime, it will then be ſoon dry enough to be drilled without farther trouble. It muſt be quick-lime, in its full ſtrength, that is uſed on this occaſion.

The bread made of ſmutty corn, is very pernicious, acting as a narcotic, and occaſioning not only ſleepineſs, but vertigoes, and even convulſions.

SMYRNA, a city and port-town of aſiatic Turky, ſituated on a bay of the Archipelago, in the province of Ionia, in leſſer Aſia, a hundred miles north of Rhodes, and two hundred miles nearly ſouth of Conſtantinople: eaſt long. 27°, north lat. 37° 30′.

SMYRNIUM, ALEXANDERS, in botany, a genus of the *pentandria digynia* claſs of plants, with an umbelliferous compound flower, made up of leſſer roſaceous ones, with five lanceolated petals: the fruit is naked, ſub-globoſe, ſtriated, and ſeparable into two parts; and the ſeeds are two, lunulated, convex on one ſide, with three ſtriæ, and plane on the other.

The leaves, roots, and ſeeds of this plant are uſed in medicine; its virtues being the ſame with thoſe of ſmallage, only in a ſomewhat ſtronger degree.

SNAFFLE, in the manege, is a very ſlender bit-mouth, without any branches, much uſed in England; the true bridles being reſerved for the ſervice of war.

The ſnaffle, or ſmall watering-bit, is commonly a ſcratch-mouth, with two very little, ſtraight branches, and a curb, mounted with a headſtall, and two long reins.

SNAIL, *limax*, in zoology, a genus of the gymnarthria, or naked inſects, the body of which is of a figure approaching to cylindric, and is perforated at the ſide: the tentacula, or horns, as they are called, are four in number, and two of them have the appearance of eyes.

There are a great many ſpecies of ſnails, whereof we ſhall only mention a few.

1. The black naked ſnail, a conſiderably large inſect, being commonly three inches long, and half an inch broad; its whole body is furrowed and much wrinkled, and is of a deep black, except the belly, which is grey. See plate CCLV. fig. 2. n° 1.

2. The naked reddiſh ſnail grows only to about two inches in length, and is alſo covered with numerous ſlight furrows. *ibid.* n° 2.

3. The amber-coloured ſnail, (*ibid.* n° 3.) when full grown, is only about an inch and a half long: its colour is a gloſſy yellow, with a caſt of brown in it, and the whole body is variegated with ſpots of a greyiſh colour.

Snails are all hermaphrodites, and are eſteemed provocatives by the Aſiatics.

SNAKE, *anguis*, in zoology. See the article ANGUIS.

The common ſnake is a harmleſs and inoffenſive animal, and might even be kept tame in houſes, to deſtroy vermin. Its fleſh is reſtorative, like that of the viper. See the article VIPER.

For the blood-ſnake, rattle-ſnake, *&c.* See the articles HÆMORRHUS, RATTLE-SNAKE, *&c.*

SNAKE-ROOT, *ſerpentaria*, in botany, a ſpecies of polygala. See POLYGALA.

SNAKE-STONE, a name given to the ammonitæ. See AMMONITÆ.

SNAKE-WEED, in botany, the ſame with biſtort. See BISTORT.

SNAPDRAGON, *antirrhinum*, in botany, a genus of the *didynamia-angioſpermia* claſs of plants, with a monopetalous perſonated flower, divided into two lips; the upper one of which is bifid, and the lower one trifid: the fruit is a roundiſh bilocular capſule, containing a great many kidney-ſhaped ſeeds.

This genus comprehends alſo the linaria, or toad-flax, the aſarina, elatine, and cymbalaria of authors.

SNATCH-BLOCK, among ſeamen, a kind of pulley. See PULLEY.

SNEEK, a town of Frieſland, in the United Provinces, twelve miles ſouth of Lewarden.

SNEEZING, *ſternutatio*, a convulſive motion of the muſcles of the breaſt, whereby the air is expelled from the noſe, with much vehemence and noiſe.

Sneezing is cauſed by the irritation of the upper membrane of the noſe, occaſioned by acrid ſubſtances floating in the air, or by medicines called ſternutatories. See SNUFF and STERNUTATORY.

SNETHAM, a market-town of Norfolk, twenty-eight miles north-weſt of Norwich.

SNIATIN, a town of Red Ruſſia, in Poland, on the confines of Moldavia: eaſt long. 25° 20′, north lat. 48°.

SNIGGLING, a method of catching eels, when they hide themſelves in holes: it is performed by thruſting a baited hook and ſtrong line into the holes where they are ſuppoſed to lie concealed; and if there be any, they will cetainly bite; ſo that if the tackling hold, the largeſt eels may be thus taken.

SNIPE, in ornithology, a ſpecies of numenius, with four brown ſtreaks on the head; it is a ſmall but beautiful bird, and

its

its fleſh is delicate, and much eſteemed at table.

SNOUT, or CALF'S-SNOUT; in botany, the ſame with ſnapdragon. See the article SNAPDRAGON.

SNOW, *nix*, in meteorology, a meteor produced in this manner: when the vapours are become conſiderably condenſed, yet not ſo far as to be liquified, or diſſolved into water; then by a ſpecial degree of coldneſs in the upper region of the air, the particles of the condenſed vapour are changed into ice; ſeveral of which adhering together, form little fleeces of a white ſubſtance, ſomewhat heavier than the air; and therefore deſcend in a ſlow and gentle manner thro' it; being ſubject, by reaſon of its lightneſs, to be driven about by the various motions of the air, and wind; and is what, when arrived to the ſurface of the earth, we call ſnow. See FROST, HAIL, *&c.*

The uſes of ſnow muſt be very great, if all be true Bartholin has ſaid in its behalf, in an expreſs treatiſe, *De nivis uſu medico*; he there ſhews, that it fructifies the earth (which, indeed, is a very old and general opinion) preſerves from the plague, cures fevers, cholics, toothachs, ſore eyes, and pleuriſies (for which laſt uſe, his countrymen of Denmark uſe to keep ſnow-water gathered in March.) He adds, that it contributes to the prolongation of life; giving inſtances of people in the Alpine mountains that live to great ages; and to the preſerving dead bodies, inſtances whereof he gives in perſons buried under the ſnow in paſſing the Alps, which are found uncorrupted in the ſummer, when the ſnow is melted.

He obſerves, that, in Norway, ſnow-water is not only their ſole drink in the winter, but ſnow even ſerves for food; people having been known to live ſeveral days, without any other ſuſtenance.

Indeed the generality of theſe medicinal effects of ſnow are not to be aſcribed to any ſpecific virtue in ſnow, but to other cauſes. It fructifies the ground, for inſtance, by guarding the corn or other vegetables, from the intenſer cold of the air, eſpecially the cold piercing winds. And it preſerves dead bodies, by conſtipating and binding up the parts, and thus preventing all ſuch fermentations or internal conflicts of their particles, as would produce putrefaction.

Snow may be preſerved by ramming it down in a dry place, under-ground, and covering it with chaff, in the manner of Ice. See the article ICE.

SNOWDON-HILL, the higheſt mountain in Wales, ſituated in Carnarvonſhire.

SNOW-DROP, in botany, the engliſh name of the galanthus. See GALANTHUS.

SNOWDROP-TREE, the ſame with the chionanthus. See CHIONANTHUS.

SNUFF, a powder chiefly made of tobacco, the uſe of which is too well known to need any deſcription here. See the article TOBACCO.

However, though tobacco be the baſis of ſnuff, yet a multiplicity of other matters are often added, to give it an agreeable ſcent.

The kinds of ſnuff being endleſs, we ſhall only obſerve, that there are three grand ſorts, *viz.* that which is only granulated, and called rappee; that which is reduced to a very fine powder, and called ſcotch, ſpaniſh, *&c.* ſnuff; and the third, a coarſe kind, remaining after ſifting the ſecond ſort.

SOAL-FISH, *ſolea*, in ichthyology, the engliſh name of the long-bodied pleuronectes, with rough ſcales on both ſides. See PLEURONECTES.

This is a fiſh deſervedly held in great eſteem at table: its uſual length is from five, or ſix, to fourteen inches in length; it is of an oblong elliptical figure, and thin in proportion to its other dimenſions: its eyes are not protuberant, but are placed at a greater diſtance than in moſt other ſpecies, and both on the left ſide.

SOAP, or SOPE, in commerce, and the manufactures, a kind of paſte, ſometimes hard and dry, and ſometimes ſoft and liquid, much uſed in waſhing, whitening linnens, and by dyers, fullers, *&c.*

The principal ſoaps of our manufacture, are the ſoft, the hard, and the bale ſoap; all which conſiſt of an intimate union of the ſalt of pot-aſh, with oil, or animal-fat.

1. The ſoft ſoap is either green or white. The principal ingredients in the green-kind are lyes drawn from pot-aſhes, and lime boiled up with tallow and oil. Firſt, the lye and tallow are put into the copper together, and when melted, the oil is put to them, and the copper made to boil; then they damp or ſtop up the fire, while the ingredients remain in the copper to knit or incorporate; which being done, they ſet the copper a boiling again,

feeding or filling it with lyes as it boils, 'till they have put in a ſufficient quantity; after which they boil it off with all convenient ſpeed, and put it into barrels.

One ſort of white ſoap is made after the ſame manner with green ſoap; excepting that they do not uſe any oil in this.

Another ſort of white ſoft ſoap is made from lyes of aſhes of lime, boiled up twice with tallow. Firſt they put a quantity of lyes and tallow into the copper together, which is kept boiling, being fed with lyes as it boils, till it is boiled enough, or that they find it grains; then they ſeparate or diſcharge the lyes from the tallowiſh part, which they put into a tub, throwing away the lye; this they call the firſt half-boil. Then they charge the copper again with freſh tallow and lye, and put the firſt half-boil out of the tub into the copper a ſecond time, and keep it boiling with freſh lye and tallow, till it is brought to perfection, and afterwards filled out into ſoap-caſks.

2. Hard ſoap is made of aſhes and tallow, and commonly boiled at twice; the firſt boiling they alſo call a half-boiling, which is performed exactly after the ſame manner as the firſt half-boil of the ſoft white-ſoap. Then they charge the copper again with freſh lye, and put into it the firſt half-boil again, feeding it with lye, as it boils, till it is boiled enough, or till it grains; then they diſcharge the lye from it, and put the ſoap into a frame to boil and harden.

3. Ball-ſoap is made alſo of lye from aſhes and tallow; they put the lye into the copper, and boil it till the watery part is quite gone, and there is nothing left in the copper but a ſort of nitrous matter (which is the very ſtrength and eſſence of the lye) then they put tallow to it, and keep the copper boiling and ſtirring for half an hour or more, in which time the ſoap is compleated, which they put into tubs or baſkets with ſheets in them, and immediately (while ſoft) make it into balls.

It takes up near twenty-four hours to boil away the watery part of the lye.

The proceſs of ſoap-boiling, as at preſent practiſed, being a very tedious, as well as expenſive, operation, Dr. Shaw propoſes a method to ſhorten it, by ſubſtituting motion in the place of fire: this motion might be eaſily given, by an engine, to any quantities of the ingredients at a time; and that ſuch a method is effectual for making ſoap, the doctor proved by the following experiment: he mixed, in a large phial, half a pint of ſoap-lye, with an ounce, or more, of oil-olive; and ſhaking theſe together, for a quarter of an hour, a true cake of ſoap was obtained on the top of the liquor, which hardened on being expoſed to the air.

SOAP, *ſapo*, in medicine. The purer hard ſoap is the only ſort intended for internal uſe; this, triturated with oily or reſinous matters, renders them ſoluble in water; and hence becomes an ingredient in pills compoſed of reſins, promoting their diſſolution in the ſtomach, and union with the animal fluids. Boerhaave always preſcribed ſoap in reſinous pills, unleſs where an alkaleſcent or putrid ſtate of the juices forbad its uſe. From the ſame quality, ſoap ſeems well fitted for diſſolving oily or unctuous matters and viſcidities in the human body; thereby opening obſtructions, and deterging all the veſſels it paſſes through. It is likewiſe a powerful menſtruum for the calculus, or ſtone in the bladder; a ſolution of it in lime-water being one of the ſtrongeſt diſſolvents that can with ſafety be taken into the ſtomach: the virtue of this compoſition is conſiderably greater than the aggregate of the diſſolving powers of the ſoap and lime-water, when unmixed. See the articles LIME-WATER and LITHONTRIPTICS.

The ſoft ſoaps are more penetrating and acrimonious than the hard, and are therefore only uſed externally.

The proper menſtruum of ſoap is a proof ſpirit, freed from its acid; this diſſolves it the moſt perfectly, and in the greateſt quantity, three ounces taking up one or more; and in this form, ſoap may, in ſome caſes, be conveniently exhibited.

To purify ſoap for medicinal uſe, ſlice it into a clean pewter veſſel, and pour upon it two gallons of rectified ſpirit of wine: place the veſſel in a bath-heat, and increaſe the fire ſo as to make the ſpirit boil, and it will ſoon diſſolve the ſoap. Let the veſſel ſtand cloſe covered in a warm place, till the liquor has grown perfectly clear; and, if any oily matter ſwim upon the ſurface, ſcum it off; then decant the limpid liquor, and diſtill off from it all the ſpirit that will ariſe in the heat of a water-bath. Expoſe the remainder to a dry air, for a few days, and it will become a white, opake, and ſome-

ſomewhat friable maſs, not in any degree acrimonious, and conſequently well fitted for medicinal purpoſes.

There are alſo ſeveral other ſaponaceous medicines, as ſoap of almonds, of tartar, &c. See ALMONDS, &c.

SOAP-EARTH, or SOAP-ROCK, in natural hiſtory. See STEATITES.

SOAR-HAWK, an appellation given to an hawk, from the time of taking her from the eyrie, till ſhe has mewed, or caſt her feathers.

SOC, or SOK, *ſoca*, in law-books, denotes juriſdiction. See JURISDICTION.

SOCAGE, an antient tenure, by which lands were held on condition of ploughing the lord's lands, and doing the operations of huſbandry, at their own charges. See TENURE.

SOCO, in ornithology, the ferrugineous ardea variegated with black. See the article ARDEA.

This is nearly of the ſize of our common heron, but the body is ſmaller in proportion to the length of the neck and legs; the head is large, and of an oblong figure, narroweſt at the front, and broader behind; the beak is five inches long, and of a greeniſh olive-colour; the eyes are large, their iris yellow, the head is a deep brown, has no creſt, and very little of the black variegation.

SOCCUS, in antiquity, a kind of high ſhoe, reaching above the ancle, worn by comedians, as the cothurnus was by tragedians. See COTHURNUS, COMEDY, TRAGEDY, and DRAMA.

SOCIETY, *ſocietas*, in general, denotes a number of perſons united together for their mutual aſſiſtance, ſecurity, intereſt, or entertainment.

The ſocial principle in man is of ſuch an expanſive nature, that it cannot be confined within the circuit of a family, of friends, or a neighbourhood: it ſpreads into wider ſyſtems, and draws men into larger communities and common-wealths; ſince it is in theſe only, that the more ſublime powers of our nature attain the higheſt improvement and perfection of which they are capable.

In ſociety, the mutual aids, which men give and receive, ſhorten the labours of each; and the combined ſtrength and reaſon of individuals give ſecurity and protection to the whole body. There is a variety of genius among mankind; ſome being formed to lead and direct others, to contrive plans of employment for individuals, and of government for communities, to invent laws and arts, and ſuperintend their execution, and in ſhort to refine and civilize human life: others again, who have not ſuch good heads, may have honeſt hearts, a true public ſpirit, love of liberty, order, &c. and finally, others ſeem beſt diſpoſed for manual exerciſes, as bodily labour. Society finds proper employment for every genius, and the nobleſt objects and exerciſes for the nobleſt geniuſes. In ſociety, a man not only finds more leiſure, but better opportunities of applying his talents with ſucceſs.

From this ſhort detail it appears, that man was formed for ſociety; which reſts on theſe two principal pillars. 1. That it afford ſecurity againſt thoſe evils, which are unavoidable in ſolitude. 2. That it enables us to obtain thoſe goods, ſome of which cannot be obtained at all, and others not ſo well, in a ſtate of ſolitude, wherein men depend wholly on their own ſagacity and induſtry. See GOVERNMENT and LAW.

Royal SOCIETY, an academy, or college, eſtabliſhed by charter, by king Charles II. for promoting natural knowledge, and uſeful arts, by experiments. See the article ACADEMY.

It conſiſts of ſeveral hundred fellows, or members, moſtly britiſh; ſome perſons of the higheſt rank, and many eminent gentlemen and learned men of other nations. Their meetings are held once a week, at their houſe in Crane-Court, Fleet-Street, London; where they diſcourſe upon the productions and rarities of nature and art, and conſider how the ſame may be improved for the good of mankind: here are alſo read letters, and other philoſophical papers, ſent by ingenious perſons, both at home and abroad; upon which they diſcourſe in the plaineſt manner, without affecting ſtudied ſpeeches. See *Philoſophical* TRANSACTIONS.

This ſociety, of which his britannic majeſty is perpetual patron, is governed by a council of twenty-one members, ten of whom are yearly choſen out of the ſociety, on St. Andrew's-day: the chief of the council bears the title of preſident, whoſe proper office is to call and diſſolve the meetings, to propoſe the matter to be debated, call for experiments, and admit ſuch members as ſhall be elected, which muſt be by a majority of at leaſt twenty-one votes: whereupon he is admitted, after paying 40 s. and ſubſcribing, That he will endeavour to promote

promote the good of the Royal Society of London, by the improvement of natural knowledge; and being thus admitted, he afterwards pays 13s. a quarter, as long as he continues a member of the ſociety.

SOCIETY *for the reformation of manners*, and putting in execution the laws againſt immorality and profaneneſs. It was ſet on foot, about thirty years ago, by five or ſix private perſons in London, but is ſince exceedingly increaſed by numbers of all denominations. A particular body of the moſt conſiderable hereof bear the expence of proſecutions, *&c.* without any contribution from the reſt. Theſe chiefly apply themſelves to the proſecuting people for ſwearing, drunkenneſs, and prophaning the ſabbath. Another body, of about fifty perſons, apply themſelves to the ſuppreſſing lewdneſs, and by them above five-hundred lewd houſes have been actually ſuppreſſed; a third body conſiſts of conſtables; and a fourth of informers. Beſides theſe, are eight other regular mixed bodies of houſe-keepers and officers, who inſpect the behaviour of the conſtables and other officers, aſſiſt in ſearching diſorderly houſes, ſeizing offenders, giving information, *&c.* There are ſeveral other ſocieties of this kind at Briſtol, Canterbury, Nottingham, *&c.*

SOCIETY *for propagating the goſpel in foreign parts*, was inſtituted by King William, in 1701, for ſecuring a maintenance for an orthodox clergy, and making other proviſions for the propagation of the goſpel in the plantations, colonies, frontiers, *&c.* To that end he incorporated the archbiſhops, ſeveral biſhops, and other nobility, gentry, and clergy, to the number of ninety, with privilege to purchaſe two-thouſand pounds, per year, inheritance and eſtates for lives, or years, with other goods, to any value. They meet yearly on the third Friday in February, to chuſe a preſident, vice-preſident, and other officers; and the third Friday in every month to tranſact buſineſs, depute fit perſons to take ſubſcriptions for the ſaid uſes, and of all monies ſo received to give account to the lord chancellor, *&c.* They have a ſtanding committee at the chapter-houſe, to prepare matters for the monthly meeting which is held at St. Martin's library.

SOCIETY *for propagating chriſtian knowledge*. This was begun in 1699, by ſome perſons of worth, *&c.* Its original deſign was to propagate religion in the plantations, to ſecure the pious education of the poor at home, and to reclaim thoſe that err in the fundamentals of chriſtianity. In the year 1701, they had procured conſiderable charities, and tranſmitted the ſame to the plantations, in libraries, bibles, catechiſms, *&c.* with a voluntary maintenance for ſeveral miniſters to be employed in the plantations; but the ſociety for propagating the goſpel in foreign parts being then inſtituted, they were incorporated by charter in the ſame, and thus diſcharged as a particular ſociety from the further purſuit of that branch of their original deſign, whereupon they wholly turned themſelves to the other, and are now very conſiderable by great acceſſions from the clergy and laity. They meet weekly to concert meaſures for raiſing charity for educating poor children, and ſetting up ſchools for that purpoſe, as alſo for the more regular diſpoſals of books for the inſtruction of the ignorant, erroneous, *&c.*

For the other ſocieties eſtabliſhed by charter, ſee the articles COLLEGE, COMPANY, and CORPORATION.

SOCIETY, in a commercical ſenſe, the ſame with partnerſhip or fellowſhip. See PARTNERSHIP and FELLOWSHIP.

SOCINIANS, in church hiſtory, a ſect of chriſtian heretics, ſo called from their founder Fauſtus Socinus, a native of Sienna, in Italy. He, about the year 1574, began openly to declare againſt the catholic faith, and taught, 1. That the eternal father was the one only God; that the word was no more than an expreſſion of the godhead, and had not exiſted from all eternity; and that Jeſus Chriſt was God no otherwiſe than by his ſuperiority above all creatures who were put in ſubjection to him by the Father. 2. That Jeſus Chriſt was not a mediator between God and men, but ſent into the world to ſerve as a pattern of their conduct; and that he aſcended up to heaven only as it were to take a journey thither. 3. That the puniſhment of hell will laſt but for a certain time, after which the body and ſoul will be deſtroyed. And, 4. That it is not lawful for princes to make war. Theſe four tenets were what Socinus defended with the greateſt zeal. In other matters, he was a lutheran or a calviniſt; and the truth is, that he did but refine upon the errors of all the antitrinitarians that went before him. The ſocinians ſpread extremely in Poland, Lithuania, and Tranſylvania. Their

Their ſentiments are explained at large in their catechiſm, printed ſeveral times under the title of Catecheſis Eccleſiarum Polonicarum, unum Deum Patrem, illiuſque filium unigenitum, una cum Sancto Spiritu, ex ſacra ſcriptura confitentium. They were exterminated out of Poland in 1655, ſince which time they have been chiefly ſheltered in Holland, where though their public meetings have been prohibited, they find means to conceal themſelves under the names of arminians and anabaptiſts. See the article ARMINIAN.

SOCKAGE, or SOCAGE. See SOCAGE.

SOCKET, BALL AND SOCKET. See BALL.

SOCKETS in a ſhip, are the holes which the pintles of the murthering pieces go into.

SOCLE, or ZOCLE, in architecture, a flat ſquare member under the baſes of pedeſtals of ſtatues, vaſes, &c. which ſerves as a foot or ſtand. Continued ſocle is a kind of continued ſtand or pedeſtal without either baſe or corniche, ranging round the whole building, called by Vitruvius ſtereobata. See STEREOBATA.

SOCMEN, or SOKEMEN, ſuch tenants as held their lands and tenements in ſocage; but the tenants in antient demeſne, ſeem moſt properly to be called ſocmans. See the article SOCAGE.

SOCNA, in our old writers, denotes ſome privilege, liberty, or franchiſe.

SOCOME, is taken for a cuſtom of grinding corn at the lord's mill; whence came the name or term of bond ſocome, by which the tenants were bound to it; and alſo love ſocome, where they did it voluntarily out of love to their lord.

SOCONUSCO, a port-town of Mexico, in north America, capital of the province of that name, ſituated on the Pacific ocean: weſt long. 98°, north lat. 15°.

SOCOTORA, an iſland in the indian ocean, about ſeventy miles long, and fifty broad, ſituated in eaſt long. 53°, north lat. 11°.

SOCRATIC PHILOSOPHY, the doctrines and opinions, with regard to morality and religion, maintained and taught by Socrates. By the character of Socrates, left us by the antients, particularly by his ſcholar Plato, Laertius, &c. he appears to have been one of the beſt and the wiſeſt perſons in all the heathen world. To him is aſcribed the firſt introducing of moral philoſophy, which is what is meant by that uſual ſaying, "That Socrates firſt called philoſophy down from heaven to earth;" that is, from the contemplation of the heavens and heavenly bodies, he led men to conſider themſelves, their own paſſions, opinions, faculties, duties, actions, &c. He wrote nothing himſelf, yet all the grecian ſects of philoſophers refer their origin to his diſcipline, particularly the platoniſts, peripatetics, academics, cyrenaics, ſtoics, &c. but the greateſt part of his philoſophy we have in the works of Plato. See the article PLATONISM, &c.

SODA, or HEAT *of the ſtomach*, in medicine, the name a diſtemper conſiſting in a heat or troubleſome burning about the pit of the ſtomach, or its leſt mouth, which ſometimes is extended the whole length of the oeſophagus, with a preſſure or ſpaſmodic conſtriction, uſually attacking the patient by fits. The cauſe is generally fat aliment, eſpecially veal, if cold drink be taken ſoon after. In ſome it proceeds from acids, in others from aromatics, ſpirituous liquors, or bilious humours. This diſorder is generally ſlight, and vaniſhes of its own accord, though in others it is of long duration. In the cure, the cauſe muſt always be attended to; if from acids, abſorbents are proper, particularly crabs-eyes and prepared ſhells mixed with a fourth or fifth part of powder of nutmeg given to half a dram, as alſo the tabellæ cardialgicæ. It is common to take chalk alone or mixed with nutmeg; but care ſhould be taken not to be too free in its uſe. Oil of tartar per deliquium, given from twenty to thirty drops in coffee, tea, broth, or warm beer, is generally efficacious, as alſo tincture of tartar and ſpirit of hartſhorn. If it proceeds from bilious humours, thirty or fifty drops of dulcified ſpirit of nitre in water, tea, or coffee, will take away the pain. When it is cauſed by fat things and draughts of cold liquor, a dram of brandy is good. Now and then laxatives ſhould be given to carry off the humours. In ſanguine conſtitutions, bleeding may be proper.

SODA *ſubethica*, among the antient phyſicians, was a term whereby they expreſſed a peculiarly ſharp and terrible pain of the head.

SODBURY, a market-town of Glouceſterſhire, ſituated ten miles north-eaſt of Briſtol.

SODDER, or SOLDER. See SOLDER.

SODOM RUINS, are ſaid to be ſometimes ſeen at the bottom of the lake called the Dead ſea, in Paleſtine: eaſt long. 38°, north lat. 31° 40'.

SODOMY,

SODOMY, the unnatural crime of buggery, thus called from the city of Sodom, which was deſtroyed by fire for the ſame. The levitical law adjudged thoſe guilty of this execrable crime to death, and the civil law aſſigns the ſame puniſhment to it. Our law alſo makes it felony. See the article BUGGERY.

There is no ſtatute in Scotland againſt ſodomy; the libel of this crime is therefore founded on the divine law, and practice makes its puniſhment to be burning alive.

SOFA, in the turkiſh cuſtoms, a bench of wood raiſed from the ground about a foot high, and placed round a hall or chamber for the people to ſit down upon, or to lie along, and in that poſture to take a view of what paſſes in the ſtreets, *&c.* for theſe benches are ſurrounded with windows; they are covered with fine turky carpets; and upon that are placed cuſhions of ſattin flowered with gold, or ſome other rich ſtuff.

SOFALA, the capital of the territory of that name in Africa, ſituated at the mouth of the river Sofala, in eaſt long. 35°, ſouth lat. 20°.

SOFFITA, or SOFFIT, in architecture, any plafond or ceiling formed of croſs beams of flying corniches, the ſquare compartiments or pannels of which are enriched with ſculpture, painting or gilding; ſuch are thoſe in the palaces of Italy, and in the apartments of Luxembourg at Paris. This word is particularly uſed for the under ſide or face of an architrave, and for that of the corona or larmier, which the antients called lacunar, the French plafond, and we uſually the drip. It is enriched with compartiments of roſes, and has eighteen drops in the doric order diſpoſed in three ranks, ſix in each, placed to the right-hand of the guttæ, and at the bottom of the triglyphs.

SOFI, or SOPHI. See the article SOPHI.

SOFTENING, in painting, the mixing and diluting of colours with the bruſh or pencil. To ſoften deſigns in black and white made with the pen, *&c.* ſignifies to weaken the tint. To ſoften a portrait, according to Felibien, is to change ſome of the ſtrokes, and give a greater degree of ſweetneſs and ſoftneſs to the air thereof, which before had ſomething rough and harſh in it.

SOGDIANA, a country of Aſia, ſituated on the north ſide of the river Oxus, which ſeparated it from antient Bactria, now a part of Uſbec Tartary.

SOGETTO, SUBJECT, in muſic, is uſed for a ſong or melody, above or below which ſome counterpoint is to be made: a counterpoint above the ſubject, is when the lower part is the ſubject; in this ſenſe it is called canto fermo, When the counterpoint is made below the ſubject, the upper part is the ſubject. If this ſubject does not change the figure or ſituation of notes, be it above or below the counterpoint, it is called the invariable ſubject, and if it changes, the variable ſubject. Sogetto is alſo uſed for the words to which ſome compoſitions is to be adapted. And, laſtly, this word is made uſe of for a ſucceſſion of many notes of one, two, or more meaſures, diſpoſed in ſuch a manner as to form one or more fugues. See COUNTERPOINT, *&c.*

SOHAM, a market-town of Cambridgeſhire, ſituated on a lake called Soham Meer, in the iſle of Ely, fourteen miles north-eaſt of Cambridge.

SOIGNIES, a town of the auſtrian Netherlands, ſituated in the province of Hainault, ten miles north-eaſt of Mons.

SOIL, *ſolum*, in agriculture and gardening, denotes earth or ground conſidered with regard to the quality of its mould for the production and growth of vegetables. See the article EARTH.

The land of England, as conſidered by the farmer, is reduced into nine ſorts of ſoil: the ſandy, the gravelly, the chalky, the ſtony, the rocky, the hazely, the black earth, the marſh, and the clay-land. See the articles SAND, GRAVEL, *&c.*

Mortimer obſerves, that theſe ſoils, in many places, are mixed and blended together, and that where it is ſo, it is much better than where they are ſeparate or ſingle; eſpecially where the mixtures happen to be of a right kind, as thoſe of the hot and the dry ſoils blended with the cold and the moiſt. Nature does this often, and art may imitate it. All ſands are hot, and all clays are cold, and therefore the laying clay upon ſandy lands, and ſand upon clayey lands, is the beſt of all manure: this alters and changes for the better the very nature of the land itſelf, whereas dung only improves it for a time, and after that leaves it as bad as it was before. Mixt ſoils, that tend to the clayey-kind, are the beſt of all others for corn. It is not only

only the natural ſoil we are to conſider, but the depth of it, and what ſoil is underneath; for the richeſt ſoil, if it be only eight or ten inches deep, and lies upon a cold clay, or upon ſtone, will not be ſo fruitful to the farmer as the leaner ſoils that lie upon better underſtrata. Gravel or ſand are the beſt under-ſtrata of all others, to make the land above prolific.

Cold and wet clays are much more fruitful in the ſouthern parts of England, than in the north. The climates, therefore, are to be conſidered, and the quantities or proportions of the different kinds in the mixed ſoils.

The greateſt article, in the culture of plants, trees, &c. is the ſoil; and in many caſes it is not ſufficient, when having found a ſoil, which once tried proves convenient, to ſuppoſe that it will always continue ſo. In track of time the ſoil, which was once proper for the nouriſhment of ſome peculiar vegetable, loſes its virtue; and this ſooner in ſome lands, and later in others. All who are converſant in huſbandry, are well acquainted with this. If a good piece of ground be choſen for the ſowing of wheat, and it produces very well the firſt year, it will not for ever continue to do ſo; the ſecond year's crop will be perhaps good, and the third and fourth tolerable: all this while the land is in heart, as the farmers expreſs it, but after this it becomes improper, and very little wheat will be raiſed if ſown upon it; yet when it refuſes to produce wheat, it will, without any alteration, produce barley in ſufficient plenty for ſome years; when it will yield no more good crops of barley, it may be ſtill ſowed with oats, and will produce that grain as well as freſh land; and when it has been worn out with all theſe, it will produce peaſe. After this it is made quite barren, and can be of no farther uſe to the farmer, the vegetative quality of it being worn off by theſe ſucceſſive crops, each ſort of grain taking off that part which is more peculiarly fitted for its own nouriſhment; the wheat firſt, and the reſt in their order.

Mr. Tull thinks, that the only difference of ſoil, except the richneſs, ſeems to be the different heat and moiſture it has; for that if theſe be rightly adjuſted, any ſoil will nouriſh any ſort of plant; for let thyme and ruſhes change places, and both will die; but let them change their ſoil, by removing the earth wherein the thyme grew from the dry hill down to the watry bottom, and plant ruſhes therein, and carry the moiſt earth wherein the ruſhes grew up to the hill, and there thyme will grow in the earth that was taken from the ruſhes, and ſo will the ruſhes grow in the earth that was taken from the thyme; ſo that it is only more or leſs water that makes the ſame earth fit for the growth of thyme or ruſhes; for our earth, when it has in the ſtove the juſt degree of heat that each ſort of plant requires, will maintain plants brought from both the Indies.

The ſame writer obſerves, that as we have no way to enrich the ſoil but by pulveration of manure, or of inſtruments, ſo nature has ordained that the ſoil ſhall be exhauſted by nothing but by the roots of plants.

There is a kind of hazely earth, Mortimer obſerves, with a rediſh caſt, frequent in Eſſex and ſome other countries, which approaches to the nature of loam, and is called by the farmers brickiſh-ſoil: the beſt produce of this earth is rye; if well dug it will bear white-oats, turnips, barley, wheat, buck-wheat, and peaſe; the natural produce in weeds, is broom, fern, quick-graſs, and the like. If it be well dunged, it will produce large crops of clover, but it ſoon wears out of it, and therefore ſhould be ſowed mixed with rye-graſs. The beſt manure for theſe lands is chalk mixed with coal-aſhes; marle makes a great improvement in them, and there is a ſtiff yellow kind of clay that moulders with the froſt, and anſwers the ſame purpoſe.

SOISSONS, a city of France, in the province of the iſle of France, ſituated on the river Ayſe, fifty-five miles north-eaſt of Paris.

SOIT FAIT COMME IL EST DESIRE', *be it done as it is deſired*, a form uſed when the king gives the royal aſſent to a private bill preferred in parliament.

SOK, SOKE, or SOC, in our antient cuſtoms. See the article SOC.

SOL, in muſic, the fifth note of the gammut, *ut, re, mi, fa, ſol, la*. See GAMMUT.

SOL, or SOU, a french coin made up of copper mixed with a little ſilver. See the article COIN.

SOL, the SUN, in aſtronomy, aſtrology, &c. See the article SUN.

SOL, in chemiſtry, is gold, thus called from an opinion that this metal is in a particular manner under the influence of the ſun. See the article GOLD.

SOL, in heraldry, denotes Or, the golden colour in the arms of ſovereign princes. See the article OR.

SOLÆUS, or SOLARIS, in anatomy, one of the extenſor muſcles of the foot, riſing from the upper and hinder part of the tibia and fibula. This is a large and fat muſcle, thicker at the middle than at the edges, and is nearly of an oval figure.

SOLANOIDES, in botany, the name of a plant otherwiſe called rivinia. See the article RIVINIA.

SOLANUM, NIGHT-SHADE, in botany, a genus of the *pentandria-monogynia* claſs of plants, the corolla whereof conſiſts of a ſingle rotated petal; the fruit is a round ſmooth berry, punctuated at the top, and formed into two cells; the receptacle is fleſhy and convex on both ſides, and the ſeeds are numerous and roundiſh.

This genus comprehends the ſolanum, melongena and lycoperſicon of authors; or the common night-ſhade, the woody night-ſhade, the love-apple, and the mad-apple, *&c.*

Common night-ſhade is uſed to allay inflammations, to ſoften and relax the fibres which undergo too violent a tenſion; they apply the bruiſed herb to the piles, or bathe the part with the juice a little warmed: this juice is ſaid to be proper in wounds where the blood is extravaſated and grumous; it is alſo ſudorific and diuretic, expelling gravel from the kidneys.

SOLAR, ſomething belonging to the ſun: thus the ſolar ſyſtem is that ſyſtem of the world wherein the heavenly bodies are made to revolve round the ſun as the center of their motion. See COPERNICAN. Alſo the ſolar year is that conſiſting of of three hundred and ſixty-five days, five hours, and forty-nine minutes, in oppoſition to the lunar year, conſiſting of three hundred and fifty-four days. See YEAR. For the ſolar month, ſolar cycle, ſolar eclipſe, *&c.* ſee the articles MONTH, CYCLE, ECLIPSE, *&c.*

SOLDAN. See the article SULTAN.

SOLDANIA BAY, a bay of the Atlantic ocean, ſituated on the ſouth-weſt coaſt of Africa, in eaſt long. 15°, ſouth latitude 33° 30′.

SOLDANELLA, in botany, a genus of the *pentandria-monogynia* claſs of plants, the corolla whereof conſiſts of a ſingle petal of a campanulated form, and jagged at the edge; the fruit is an oblong cylindric capſule, obliquely ſtriated, containing only one cell, and opening in ten places at the point; the ſeeds are numerous, acuminated, and ſmall; the receptacle columnar and free.

SOLDER, SODDER, or SODER, a metalic or mineral compoſition uſed in ſoldering or joining together other metals. See the next article.

Solders are made of gold, ſilver, copper, tin, biſmuth, and lead; uſually obſerving, that in the compoſition there be ſome of the metal that is to be ſoldered mixed with ſome higher and finer metals. Goldſmiths uſually make four kinds of ſolder, *viz.* ſolder of eight, where to ſeven parts of ſilver there is one of braſs or copper; ſolder of ſix, where only a ſixth part is copper; ſolder of four, and ſolder of three. It is the mixture of copper in the ſolder that makes raiſed plate come always cheaper than flat. The ſolder uſed by plumbers is made of two pounds of lead to one of block-tin. Its goodneſs is tried by melting it and pouring the bigneſs of a crown-piece upon a table; for if good, there will ariſe little bright ſhining ſtars therein. The ſolder for copper is made like that of the plumbers, only with copper and tin; for very nice works, inſtead of tin they ſometimes uſe a quantity of ſilver. Solder for tin is made of two thirds of tin and one of lead; but where the work is any thing delicate, as in organ pipes, where the juncture is ſcarce diſcernable, it is made of one part of biſmuth and three parts of pewter.

SOLDERING, among mechanics, the joining and faſtening together two pieces of the ſame metal, or of two different metals, by the fuſion and application of ſome metalic compoſition on the extremities of the metals to be joined. See the laſt article.

To ſolder upon ſilver, braſs or iron: take ſilver, five penny-weight; braſs, four penny-weight; melt them together for ſoft ſolder, which runs ſooneſt. Take ſilver, five penny-weight; copper, three penny-weight; melt them together for hard ſolder. Beat the ſolder thin, and lay it on the place to be ſoldered, which muſt be firſt fitted and bound together with wire, as occaſion requires; then take borax in powder, and temper it like pap, and lay it upon the ſolder, letting it dry; then cover it with quick coals, and blow, and it will run immediately; take it preſently out of the fire, and it is done. It is to be obſerved, that if any thing is to be ſoldered in two places, which

which cannot well be done at one time, you muſt firſt ſolder with the harder ſolder, and then with the ſoft; for if it be firſt done with the ſoft, it will unſolder again before the other is ſoldered. Let it be obſerved, that if you would not have your ſolder run about the piece that is to be ſoldered, you muſt rub ſuch places over with chalk.

In the ſoldering either of gold, ſilver, copper, and all the metals before-mentioned, there is generally uſed borax in powder, and ſometimes roſin. As to iron, it is ſufficient that it be heated red hot, and the two extremities thus hammered together, by which means they will become incorporated into one another.

SOLDIER, a military man liſted to ſerve a prince or ſtate, in conſideration of a certain daily pay.

The ſoldiers are properly the land forces of a kingdom or ſtate; but in England it is againſt the antient law to keep an army of ſoldiers in time of peace. Where any ſoldier that is lawfully retained ſhall depart from his colours without licence, he is declared to be guilty of felony by 18 Hen. VI. c. 9. and every ſoldier who either cauſes a mutiny or deſerts the ſervice, ſhall be puniſhed with death or otherwiſe, as a court-martial ſhall think fit. Alſo perſons ſuſpected of deſertion, are to be apprehended by conſtables, who ſhall be allowed a reward of 20s. for every ſuch deſerter. See the article DESERTER.

By the 4 Geo. I. c. 4. it is ordained, that no ſoldier ſhall be taken out of the ſervice by any proceſs at law, unleſs it be for ſome criminal matter, or where the debt he owes amounts to 10l. at the leaſt, of which affidavit is to be made, *&c.* Soldiers muſt be quartered in inns and alehouſes only, and not in private houſes, without the conſent of the owners, under certain penalties: and where victuallers refuſe ſoldiers quartered on them, or conſtables receive any reward for excuſing their neglect, they forfeit a ſum not above 5l. nor under 30s. by 3 Geo. II. c. 2. A perſon inliſted for a ſoldier, within four days after, is to be carried before the next juſtice or chief magiſtrate of a town, and is to declare his aſſent that he liſted voluntarily, *&c.* but if he then diſſents thereto, on his returning the money received, and paying 20s. he may be diſcharged. In caſe any ſubject of Great Britain or Ireland ſhall liſt or enter himſelf, or procure any one to be enliſted a ſoldier to go beyond the ſeas, without leave obtained from his majeſty, ſuch perſon ſhall be puniſhed as a felon by 8 and 9 Geo. II. There are acts annually made for puniſhing mutiny, *&c.* of ſoldiers and falſe muſters, and for the better payment of the army and their quarters, *&c.* See COURT-MARTIAL.

SOLDURII, in antiquity, a kind of military clients or retainers to the great men in Gaul, particularly in Aquitania, mentioned by Cæſar. The ſoldurii were people who ſhared all the good and ill fortune of their patrons, to whom if any diſaſter happened, they either underwent the ſame, or killed themſelves; and Cæſar aſſures us, that no one had been ever known to refuſe the alternative. Vigenere takes them to have been more than common ſoldiers, and to be even gentlemen in penſion, or appointment.

SOLE, in the manege, a nail or ſort of horn under a horſe's foot, which is much more tender than the other horn that incompaſſes the foot, and by reaſon of its hardneſs is properly called the horn or hoof. A horſe's ſhoe ought to be ſo ſet upon the hoof as not to bear upon the ſole, for otherwiſe the ſole would be hurt, and not only make the horſe lame, but corrupt the fleſh that ſeparates it from the coffin-bone. To take out the ſole, is to do it without touching the horn of the hoof; or if you take off the horn, you make a hoof-caſt.

SOLEA, the SOAL FISH. See SOAL.

SOLEÆ, among the Romans, a kind of ſandals or ſlippers which covered only the ſole of the feet, and were bound on with thongs of leather, inſtead of which the women and the effeminate ones of the other ſex tied them on with purple-coloured ribbons, or ſuch as were variouſly adorned with gold and ſilver.

SOLECISM, *ſoloeciſmus*, in grammar, a falſe manner of ſpeaking contrary to the uſe of language and the rules of grammar, either in reſpect of declenſion, conjugation, or ſyntax.

SOLEMN, *ſolennis*, ſomething performed with much pomp, ceremony, and expence: thus we ſay, ſolemn feaſts, ſolemn funerals, ſolemn games, *&c.* See the articles FEAST, FUNERAL, *&c.*

In law, ſolemn ſignifies ſomething authentic, or that is cloathed in all its formalities.

SOLEN, or RAZOR-SHELL, in ichthyology, a genus of ſhells of a bivalve, oblong

oblong and ſomewhat rounded figure, with both the extremities open; the animal inhabiting it is a tethys. See the article TETHYS.

There are ſeveral ſpecies of the ſolen, ſome whereof are ſtraight, others crooked, ſome red, others variegated with brown and blue, ſome brown and white, others of a violet-purple colour: this laſt is a beautiful ſmooth ſhell, from three to ſix inches long, and from one third to three quarters of an inch in diameter. There is alſo another not inelegant ſpecies, variegated with brown and blue, and a little arcuated. See plate CCLV. fig. 3.

SOLET and DEBET, words uſed in writs, *&c.* to recover rights, *&c.* See DEBET.

SOLE-TENANT, one that holds lands, *&c.* in his own right only, without any other perſon joined. A perſon muſt be ſeiſed of a ſole eſtate to deviſe the ſame by will, or for the wife to have a dower therein, *&c.* And where a man and his wife hold land for their lives, the remainder to their ſon, in that caſe if the man dies the lord ſhall not have heriot, becauſe he does not die ſole-tenant.

SOLFAING, in muſic, the naming or pronouncing the ſeveral notes of a ſong by the ſyllables *ut, re, mi, fa, ſol,* &c. and in learning to ſing it.

Of the ſeven notes in the french ſcale *ut, re, mi, fa, ſol, la, ſi,* only four are uſed among us in ſinging, as *mi, fa, ſol, la:* their office is principally in ſinging, that by applying them to every note of the ſcale, it may not only be pronounced with more eaſe, but chiefly that by them the tones and ſemitones of the natural ſcale may be better marked out and diſtinguiſhed. This deſign is obtained by the four ſyllables *fa, ſol, la, mi.* Thus from *fa* to *ſol* is a tone, alſo from *ſol* to *la,* and from *la* to *mi,* without diſtinguiſhing the greater or leſs tone; but from *la* to *fa,* alſo from *mi* to *fa,* is only a ſemitone. If then theſe be applied in this order, *fa, ſol, la, fa, ſol, la, mi, fa,* &c. they expreſs the natural ſeries from C; and if that be repeated to a ſecond or third octave, we ſee by them how to expreſs all the different orders of tones and ſemi-tones in the diatonic ſcale; and ſtill above *mi* will ſtand *fa, ſol, la,* and below it the ſame inverted *la, ſol, fa,* and one *mi* is always diſtant from another an octave, which cannot be ſaid of any of the reſt, becauſe after *mi* aſcending come always *fa, ſol, la, fa,* which are repeated invertedly deſcending.

To conceive the uſe of this, it is to be remembered, that the firſt thing in learning to ſing, is to make one raiſe a ſcale of notes by tones and ſemi-tones to an octave, and deſcend again by the ſame; and then to raiſe and fall by greater intervals at a leap, as thirds and fourths, *&c.* and to do all this by beginning at notes of different pitch. Then thoſe notes are repreſented by lines and ſpaces, to which theſe ſyllables are applied, and the learners taught to name each line and ſpace thereby, which makes what we call ſolfaing, the uſe whereof is, that while they are learning to tune the degrees and intervals of ſound, expreſſed by notes on a line or ſpace, or learning a ſong to which no words are applied, they may not only do it the better by means of articulate ſounds, but chiefly, that by knowing the degrees and intervals expreſſed by thoſe ſyllables, they may more readily know the places of the ſemi-tones, and the true diſtance of the notes. See the article SINGING.

SOLICITOR, or SOLLICITOR, *ſolicitator,* a perſon employed to take care of, and manage ſuits depending in the courts of law or equity; and thoſe of the lower ſort, it is obſerved, are too often made uſe of, to the damage of the people, and the increaſe of champerty and maintenance. Solicitors are within the ſtatute to be ſworn and admitted by the judges, before they are allowed to practiſe in our courts, in like manner as attornies.

There is alſo a great officer of the law, next to the attorney-general, who is ſtiled the king's ſolicitor-general; who holds his office by patent, during the king's pleaſure; has the care and concern of managing the king's affairs, and has fees for pleading, beſides other fees ariſing by patents, *&c.* He hath his attendance on the privy council; and the attorney-general and he were antiently reckoned among the officers of the exchequer; they have their audience, and come within the bar in all other courts.

SOLID, in philoſophy, a body whoſe parts are ſo firmly connected together, as not to give way, or ſlip from each other upon the ſmalleſt impreſſion: in which ſenſe ſolid ſtands oppoſed to fluid. See the article FLUID and BODY.

Geometricians define a ſolid to be the third ſpecies of magnitude, or that which has three dimenſions, *viz.* length, breadth, and thickneſs or depth.

A ſolid

Fig. 1. SOLID of least resistance

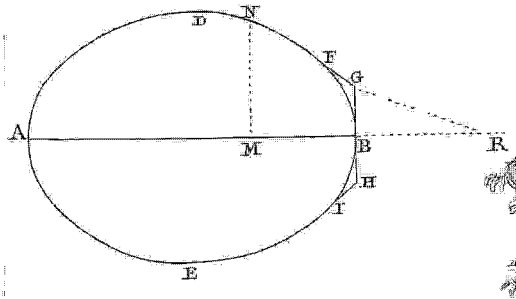


Fig. 2. SOLIDAGO, GOLDEN ROD

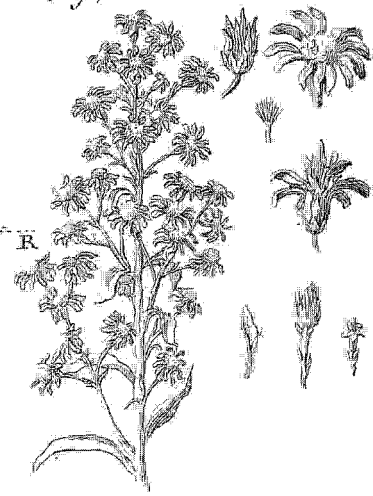


Fig. 3. SONCHUS, the SOW-THISTLE

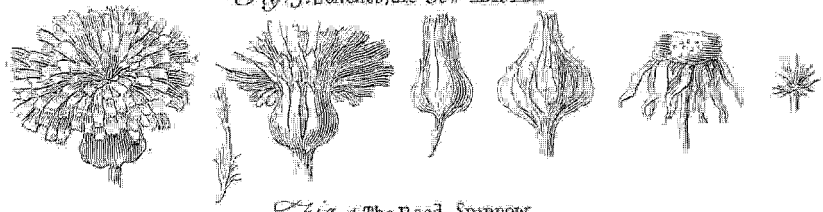


Fig. 4 The Reed-SPARROW

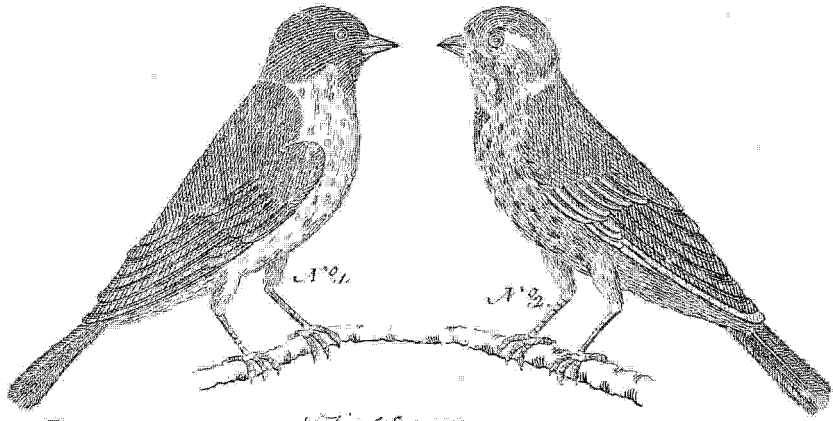
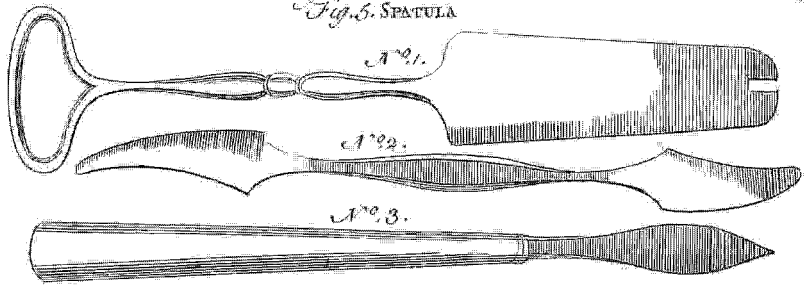


Fig. 5. SPATULA



T. Jefferys sculp

A ſolid may be conceived to be formed by the revolution, or direct motion, of a ſuperficies of any figure whatever, and is always terminated or contained under one or more planes or ſurfaces, as a ſurface is under one or more lines.

Solids are commonly divided into regular and irregular. The regular ſolids are thoſe terminated by regular and equal planes, and are only five in number, *viz.* the tetrahedron, which conſiſts of four equal triangles; the cube, or hexahedron, of ſix equal ſquares; the octahedron, of eight equal triangles; the dodecahedron, of twelve; and the icoſihedron, of twenty equal triangles. See the articles TETRAHEDRON, CUBE, *&c.*

The irregular ſolids are almoſt infinite, comprehending all ſuch as do not come under the definition of regular ſolids; as the ſphere, cylinder, cone, parallelogram, priſm, parallelopiped, *&c.* See the article SPHERE, CYLINDER, *&c.*

SOLID *of leaſt reſiſtance.* Sir Iſaac Newton, in his Principia, ſhews, that if there be a curve figure, as DNFG (plate CCLVI. fig. 1.) of ſuch a nature, as that from any point, as N, taken in its circumference, a perpendicular NM be let fall on the axis AB; and if from a given point, as G, there be drawn the right line GR, parallel to a tangent to the curve in the point N, cutting the axis produced in R, and the proportion then be, as $NM : GR :: GR^3 : 4BG \times GR$; the ſolid generated by the revolution of this curve about its axis AB, when moved ſwiftly in a rare and elaſtic medium, will meet with leſs reſiſtance from the medium, than any other circular ſolid whatever, of the ſame length and breadth.

SOLID ANGLE, is that formed by three or more planes meeting in a point, like the point of a diamond well cut.

SOLID BASTION. See BASTION.

SOLID NUMBERS, are thoſe which ariſe from the multiplication of a plane number, by any other whatſoever; as 18 is a ſolid number made of 6 (which is plane) multiplied by 3; or of 9 multiplieed by 2.

SOLID PROBLEM, in mathematics, is one which cannot be geometrically ſolved unleſs by the interſection of a circle and a conic ſection: or, by the interſection of two other conic ſections, beſides the circle.

As to deſcribe an iſoſceles triangle on a given right line, whoſe angle at the baſe ſhall be triple to that at the vertex.

This will help to inſcribe a regular heptagon in a given circle; and may be reſolved by the interſection of a parabola, and a circle.

This problem alſo helps to inſcribe a nonagon in a circle; and may be ſolved by the interſection of a parabola, and an hyperbola between its aſymptotes, *viz.*

To deſcribe an iſoſceles triangle, whoſe angle at the baſe ſhall be quadruple of that at the vertex.

And ſuch a problem as this hath four ſolutions, and no more; becauſe two conic ſections can cut one another but in four points.

Line of SOLIDS, on the ſector. See the article SECTOR.

SOLIDS, in anatomy, *&c.* denote the continent parts of the human body; being a congeries of pipes, or veſſels, which contain a liquor.

The ſolid parts of the body, though equally compoſed of veſſels, are different with regard to their conſiſtence; ſome being hard, and others ſoft. The hard, as the bones and cartilages, give firmneſs and attitude to the body, and ſuſtain the other parts: the ſoft parts, either alone, or together with the hard, ſerve to execute the animal functions.

The ſolids are commonly divided into ſimilar or ſimple; and diſſimilar, compounded, or organic. The ſimilar parts are the fibres, membranes, bones, cartilages, ligaments, muſcles, tendons, aponeuroſes, glands, arteries, veins, nerves, the ſecretory and excretory canals, and the common integuments. See the articles FIBRE, MEMBRANE, *&c.*

The diſſimilar are ſuch as are compoſed of the former, as the viſcera and other parts of the body, *viz.* the head, neck, thorax, abdomen, and extremities: every one of which is again ſubdivided into leſſer portions. See the articles HEAD, THORAX, INTESTINES, *&c.*

SOLIDAGO, GOLDEN ROD, in botany, a genus of the *ſyngeneſia-polygamia-ſuperflua* claſs of plants, the receptacle of which is naked, the down ſimple, and the radii of each corollula about five in number: add to this, that the ſquamæ of the cup are imbricated and cloſed.

The flowers of the golden-rod are of the radiated kind, the diſc of which is covered with floſcules and ſemi-floſcules, as repreſented in plate CCLVI. fig. 2.

Golden-rod grows wild in heaths and woods, producing ſpikes of yellow flowers

in

in Auguſt: its leaves, which have a moderately aſtringent and bitter taſte, are eſteemed good in diſorders ariſing from debility and laxity of the viſcera.

SOLIDITY, *ſoliditas*, that property of matter, or body, by which it excludes all other bodies from the place which itſelf poſſeſſes: and as it would be abſurd to ſuppoſe, that two bodies could poſſeſs one and the ſame place at the ſame time, it follows, that the ſofteſt bodies are equally ſolid with the hardeſt. See the articles MATTER and IMPENETRABILITY.

Among geometricians, the ſolidity of a body denotes the quantity or ſpace contained in it, and is called alſo its ſolid content, which may be ſeen under the ſeveral articles CUBE, CYLINDER, SPHERE, PYRAMID, CONE, &c.

SOLIDITY, in architecture, is applied both to the conſiſtence of the ground, whereon the foundation of a building is laid; and to a maſſive in maſonry, of extraordinary thickneſs, without any cavity within.

SOLILOQUY, *ſoliloquium*, a reaſoning or diſcourſe which a man holds with himſelf; or, more properly, according to Papias, it is a diſcourſe by way of anſwer to a queſtion, that a man propoſes to himſelf.

Soliloquies are become very common things on the modern ſtage; yet can nothing be more inartificial, or more unnatural, than an actor's making long ſpeeches to himſelf, to convey his intentions to the audience. Where ſuch diſcoveries are neceſſary to be made, the poet ſhould rather take care to give the dramatic perſons ſuch confidants as may neceſſarily ſhare their inmoſt thoughts, by which means they will be more naturally conveyed to the audience: yet is even this a ſhift, an accurate poet would not be found to have occaſion for. The uſe and abuſe of ſoliloquies is well delivered by the duke of Buckingham, in the following lines:

Soliloquies had need be very few,
Extremely ſhort, and ſpoke in paſſion too.
Our lovers talking to themſelves, for want
Of others, make the pit their confidant:
Nor is the matter mended yet, if thus
They truſt a friend, only to tell it us.

SOLINGEN, a town of Germany, in the circle of Weſtphalia and dutchy of Berg, fifteen miles ſouth-eaſt of Duſſeldorp.

SOLIS VIA. See the article VIA.

SOLITARY, *ſolitarius*, ſomething retired, or in private, remote from the company or commerce of others of the ſame ſpecies.

SOLITARIES, a denomination of nuns of St. Peter of Alcantara, inſtituted in 1676, the deſign of which is to imitate the ſevere penitent life of that ſaint: thus they are to keep a continual ſilence, never to open their mouths to any body but themſelves; employ their time wholly in ſpiritual exerciſes, and leave the temporal concerns to a number of maids, who have a particular ſuperior in a ſeparate part of the monaſtery: they always go bare-footed, without ſandals; gird themſelves with a thick cord, and wear no linnen.

SOLITAURILIA. See the article SUOVETAURILIA.

SOLMS, the capital of the county of Solms, in the landgraviate of Heſſe-Caſſel, in Germany, thirty-five miles north of Frankfort.

SOLO, in muſic, a term uſed in pieces conſiſting of ſeveral parts, to mark thoſe that are to perform alone: it is ſometimes denoted by S.

When two or three parts play, or ſing, ſeparately from the grand chorus, they are called a dio ſoli, a tre ſoli, &c.

SOLOMON'S ISLANDS, a cluſter of iſlands in the Pacific ocean, ſituated between 130° and 140° weſt longit. and between 7° and 12° ſouth latitude.

SOLOMON'S SEAL, in botany. See the article POLYGONATUM.

SOLOTHURN, or SOLEURE, one of the cantons of Switzerland, lying between thoſe of Baſil and Bern, the former on the north, and the latter on the ſouth.

The city of Solothurn, capital of the ſaid canton, is ſituated in eaſt long. 7° 15′, and north lat. 47° 18′.

SOLSTICE, in aſtronomy, that time when the ſun is in one of the ſolſtitial points; that is, when he is at his greateſt diſtance from the equator, thus called, becauſe he then appears to ſtand ſtill, and not to change his diſtance from the equator for ſome time; an appearance owing to the obliquity of our ſphere, and which thoſe living under the equator are ſtrangers to.

The ſolſtices are two in each year, the æſtival or ſummer-ſolſtice, and the hyemal or winter-ſolſtice: the ſummer-ſolſtice is when the ſun ſeems to deſcribe the tropic of cancer, which is on June 22, when he makes the longeſt day: the winter-ſolſtice is when the ſun enters the firſt degree, or ſeems to deſcribe the tropic of capricorn, which is on December 22, when

when he makes the ſhorteſt day. See the article TROPIC.

This is to be underſtood as in our northern hemiſphere; for in the ſouthern, the ſun's entrance into capricorn makes the ſummer-ſolſtice, and that into cancer the winter-ſolſtice. See the article GLOBE.

The two points of the ecliptic, wherein the ſun's greateſt aſcent above the equator, and his deſcent below it, are terminated, are called the ſolſtitial points; and a circle, ſuppoſed to paſs through the poles of the world and theſe points, is called the ſolſtitial colure. See the article COLURE.

The ſummer-ſolſtitial point is in the beginning of the firſt degree of cancer, and is called the æſtival or ſummer-point; and the winter-ſolſtitial point is in the beginning of the firſt degree of capricorn, and is called the winter-point. Theſe two points are diametrically oppoſite to each other.

SOLVENT, the ſame with diſſolvent. See the article DISSOLVENT.

SOLUTION, in chemiſtry, denotes an intimate mixure of ſolid bodies with fluids, ſo as ſeemingly to form one homogene liquor: the diſſolving fluid is termed the diſſolvent or menſtruum. See the articles DISSOLVENT and MENSTRUUM.

The principles of ſolution have been already explained under the article MENSTRUUM.

As to the manner of effecting ſolutions, it varies according to the different ſolvents uſed for that purpoſe, and is reduced to the following heads by Boerhaave: 1. Solution is perſormed by water, by diluting, infuſing, boiling, diſtilling, mixing, fermenting, putrefying, and ſeparating. 2. With oil, by diluting, infuſing, boiling, diſtilling, mixing, ſeparating; but not by fermenting, or by putrefying. 3. With fire, by calcining, roaſting, burning, melting, ſubliming, mixing, ſeparating, and promoting ſeveral other operations. 4. With the aſſiſtance of air, by fermenting, putrefying, agitating, exciting, and adding other parts capable of diſſolving. 5. With fermented ſpirits, by diluting, infuſing, boiling, diſtilling, mixing, and making oils thinner. 6. With alkaline ſalts, by calcining, torrefying, burning, melting, mixing, and ſeparating, according to the various force of a dry fire employed. 7. By volatile alkaline ſalts, by ſubliming in the dry way; and by diluting, diſtilling, and digeſting in the moiſt way. 8. With fixed alkaline ſalts, aſſiſted and moved by water and fire, by digeſting, boiling, diluting, ſeparating, and mixing. 9. With fixed acid ſalts, as thoſe of alum, ſulphur, and vitriol; either ſeparately in a liquid form, or in their calxes, by diluting, boiling, diſtilling, digeſting: or in a dry form, by calcining, roaſting, burning, and diſtilling. 10. With volatile acid ſalts, by diluting, digeſting, diſtilling and inſinuating. 11. With compound ſalts and ſoaps, by calcining, ſubliming, diſtilling, and digeſting, either in a dry or a liquid form. 12. With metals, by fuſion and amalgamation. See the articles DILUTING, DISTILLING, &c.

In pharmacy, however, the principal menſtrua are water, vinous ſpirits, oils, and acid and alkaline liquors.

Water is the diſſolvent of all ſalts, vegetable gums, and of animal jellies: of the firſt it diſſolves only a determinate quantity, though of one kind of ſalt more than another; and being thus ſaturated, leaves any additional quantity of the ſame ſalt untouched: but it is never ſaturated with the two latter, uniting readily with any proportions of them and forming, with different quantities liquors of different conſiſtencies. When aſſiſted by trituration, it likewiſe diſſolves the vegetable gummy reſins, as ammoniacum and myrrh; the ſolutions of which, though imperfect, or not tranſparent, but turbid and of a milky hue, are nevertheleſs applicable to valuable purpoſes in medicine.

Rectified ſpirit of wine diſſolves the eſſential oils and reſins of vegetables, the pure diſtilled oils of animals, and ſoaps; though it does not act upon the exſiccated oil and fixed alkaline ſalt of which ſoap is made: it alſo, by the aſſiſtance of heat, diſſolves volatile alkaline ſalts, but more eſpecially the neutral ones, as the diureticus, &c.

Oils diſſolve vegetable reſins and balms, wax, animal fats, mineral bitumen, ſulphur, and certain metallic ſubſtances, particularly lead: however, the exſiccated oils are more powerful menſtrua for moſt of theſe bodies, than the oils obtained by diſtillation; becauſe the former are more capable of ſuſtaining, without injury, a ſtrong degree of heat, which, in moſt caſes, is neceſſary to enable them to act.

Acids

Acids diſſolve alkaline ſalts and earths, and metallic ſubſtances: however, the different acids differ greatly in their action upon theſe laſt. The vegetable acids diſſolve a conſiderable quantity of zinc, iron, copper, and tin; and extract ſo much from the metallic part of antimony as to become powerfully emetic: they likewiſe diſſolve lead, if previouſly calcined; but more copiouſly, if corroded by their ſteam. The marine acid diſſolves zinc, iron, and copper; and though it ſcarce acts upon any other metallic ſubſtance, in the common way, may nevertheleſs be artfully combined with them all, except gold: ſuch is the corroſive ſublimate of the ſhops. The nitrous acid is the common menſtruum of all metallic ſubſtances, except gold and the antimonial ſemi-metal, which are ſoluble only in a mixture of the nitrous and marine acids, called aqua regia. The vitriolic acid eaſily diſſolves zinc, iron, and copper: and may be made to corrode, or imperfectly diſſolve, moſt of the other metals. See ACID.

Alkaline lixivia diſſolves oils, reſins, and ſulphur; but their power is greatly promoted by the addition of quick-lime, as is evident in the making of ſoap and the common cauſtics. Thus aſſiſted, they reduce the fleſh, bones, and other ſolid parts of animals, into a gelatinous matter.

Solutions made in water and in ſpirit of wine, poſſeſs the virtues of the bodies diſſolved: whereas oils generally blunt its activity, and acids and alkalies alter natural qualities. Hence watery and ſpirituous liquors are the only proper menſtrua of the native virtues of vegetable and animal matters.

Moſt of the foregoing ſolutions are eaſily effected by pouring the menſtruum on the body to be diſſolved, and ſuffering them to ſtand together, for ſome time, expoſed to a ſuitable warmth: a ſtrong heat is generally neceſſary to enable oils and alkaline liquors to perform their office. The action of acids is uſually accompanied with heat, effervescence, and a copious diſcharge of fumes. And as theſe fumes, which ariſe during the diſſolution of ſome metals in the vitriolic acid, are inflammable, the operator ought to be careful, leſt, by the imprudent approach of a candle, the exhaling vapour take fire.

Solution is much facilitated, by powdering ſuch tenacious bodies as are friable; and ſlicing, or raſping, into ſmall parts ſuch whoſe texture does not admit of being powdered: this, in ſome caſes, is of ſuch importance, that the operation proves extremely tedious, if it be neglected. In ſolutions of metals, earths, or ſalts, with acid ſpirits, care ſhould be taken not to mix them too haſtily, otherwiſe the ebulition will cauſe the mixed liquor to overflow the veſſels; and, in ſome caſes, the unmanageable heat, together with the noxious fumes, will give the operator great embarraſſment.

But beſides the ſolutions made by adding fluid menſtruums to the bodies to be diſſolved, there is another kind, called deliquiation, or ſolution per deliquium, in which the moiſture of the air is the menſtruum. It is performed by expoſing the matter to be diſſolved to the air, in cellars, or other damp places; for fixed alkaline and neutral ſalts, and ſome metallic ſalts, being thus expoſed, attract its humidity, and at length become liquid. Some ſubſtances, not diſſoluble by the application of water in its groſſer form, as the butter of antimony, are eaſily liquified by this ſlow action of the aerial moiſture. See ANTIMONY.

SOLUTION, in algebra and geometry, is the anſwering a queſtion, or the reſolving any problem propoſed. See the articles ALGEBRA and GEOMETRY.

SOLUTION *of continuity*, in ſurgery, is the ſeparation of the natural coheſion of the ſolid parts of the body, by a wound. See CONTINUITY and WOUND.

SOLUTIVE, an appellation given to laxative and looſening medicines. See the article LAXATIVE.

Solutive tartar is a preparation of tartar, made by boiling eight ounces of cream of tartar with four ounces of fixed ſalt of tartar. See TARTAR.

SOMERSETSHIRE, a county of England, ſituated on the Briſtol-channel, and bounded by Wiltſhire, on the eaſt; by Dorſetſhire, on the ſouth; and by Devonſhire, on the weſt: it is famous for the cloth manufacture.

SOMERTON, a market-town of Somerſetſhire, twelve miles ſouth of Wells.

SOMME, a river of France, which runing from eaſt to weſt through Picardy, by Amiens and Abbeville, falls into the Britiſh-channel near St. Vallery.

SOMMIERS, a town of Languedoc, in France, fourteen miles north-eaſt of Montpelier.

SOMNAMBULI,

SOMNAMBULI, in medicine, perſons who walk in their ſleep, otherwiſe called noctambuli. See NOCTAMBULI.

SOMNIFEROUS, or SOPORIFEROUS. See the article SOPORIFEROUS.

SOMNOLENTUM COMA, in medicine. See the article COMA.

SON, *filius*, an appellation given to a male child, conſidered in the relation he bears to his parents.

A baſtard is termed an illegitimate, or natural ſon. See BASTARD.

SONATA, in muſic, a piece, or compoſition, intended to be performed by inſtruments only; in which ſenſe it ſtands oppoſed to cantata, or a piece deſigned for the voice. See CANTATA.

There are ſonatas from one to eight parts, but uſually they are performed by a ſingle violin, or with two violins and a thorough baſs for the harpſichord, and frequently a more figured baſs for the baſs-viol.

Sonatas, though extremely numerous, are reduced by the Italians to two kinds: 1. Thoſe proper for church-muſic, which uſually begin with a grave and ſolemn motion, and afterwards ſtrike into a briſker and gayer manner: theſe are what they more peculiarly call ſonatas. 2. Thoſe for the chamber, being little pieces for dancing.

SONCHUS, the SOW-THISTLE, in botany, a genus of the *ſyngeneſia-polygamia-æqualis* claſs of plants, the compound flower of which is imbricated and uniform; and the leſſer corollulæ of which it is compoſed, monopetalous, linear, and quinquedentated: the ſtamina are five very ſhort capillary filaments: there is no pericarpium but the cup, which cloſes for that purpoſe, and within it are the ſeeds, ſomewhat oblong, winged with down, and affixed to the thalamus, or receptacle. See plate CCLVI. fig. 3.

Sonchus is accounted cooling and attenuant, and accordingly preſcribed in the ſtranguries, as alſo in inflammations of all kinds, to be applied externally in the form of a cataplaſm.

SONCINO, a town of the dutchy of Milan, in Italy, thirty-three miles eaſt of the city of Milan.

SONDRIO, a town of the Griſons, being the capital of the Valteline: eaſt long. 9° 50′, north lat. 46° 15′.

SONG, in poetry, a little compoſition, conſiſting of eaſy and natural verſes, ſet to a tune in order to be ſung.

The ſong much reſembles the madrigal, and ſtill more the ode, which is nothing but a ſong according to the antient rules. See MADRIGAL and ODE.

The ſubject of a ſong is uſually love or wine; whence M. le Brun defines a modern ſong to be either a ſoft and amorous, or a lively and bacchic thought, expreſſed in a few words. But, be the ſubject of the ſong what it will, the verſes are to be eaſy, flowing, and natural, and muſt contain a certain harmony which neither ſhocks the reaſon or the ear, and which unites poetry and muſic agreeably together.

SONG, in muſic, is applied in general to a ſingle piece of muſic, whether contrived for the voice or an inſtrument. See the article COMPOSITION.

A ſong, ſays Mr. Malcolm, may be compared to an oration: for as, in this latter, there is a ſubject, *viz.* ſome perſon or thing the diſcourſe is referred to, and which is always to be kept in view through the whole; ſo, in every regular and melodious ſong, there is one note which regulates the reſt; wherein the ſong begins, and at laſt ends; and which is, as it were, the principal matter, or muſical ſubject, to be regarded in the whole courſe of the ſong; and this principal or fundamental note is called the key of the ſong. See KEY.

SONNA, a book of mahometan traditions, wherein all the orthodox muſſulmen are required to believe. See SONNITES.

SONNET, in poetry, a compoſition contained in fourteen verſes, *viz.* two ſtanzas, or meaſures, of four verſes each, and two of three; the eight firſt verſes being all in three rhimes.

The ſonnet is of italian origin, and Petrarch is allowed to be its father. It is held the moſt difficult and artful of all compoſitions, as requiring the utmoſt accuracy and exactneſs. It ſhould end with ſome pretty and ingenious thought, and its cloſe ſhould be particularly beautiful, otherwiſe the ſonnet is naught.

SONNITES, among the mahometans, an appellation given to the orthodox muſſulmen, or true believers; in oppoſition to the ſeveral heretical ſects, particularly the ſchiites, or followers of Ali.

The ſonnites are ſo called from their believing in the ſonna, or book of mahometan traditions; which the ſchiites reject as apocryphal. The Turks aſſume the name of ſonnites in oppoſition to the Perſians, who are ſchiites.

SOOP, or SOUP. See SOUP.

SOOT, *fuligo*, a volatile matter, arising from wood, and other fuel, along with the smoke; or rather, it is the smoke itself, fixed and gathered on the sides of the chimney.

Wood-soot is of a shining black colour, a disagreeable smell, and an acrid, bitter and nauseous taste; its chief use, for medicinal purposes, being in hysterical cases, in which it is sometimes exhibited in conjunction with the fetid gums.

The volatile salt and spirit of soot are, when sufficiently purified, not different in quality from those of animal substances; though some prefer them in nervous complaints, and particularly in epileptic cases. The tincture of soot is made thus: take of wood-soot, two ounces; of asa fœtida, one ounce; and proof-spirit, two pints; digest and strain. It is good not only in hysterical cases, but also in epilepsies, and other nervous disorders.

Soot makes an excellent manure for cold lands that have been over run with moss; but the soot of sea-coals is better for this purpose than that of wood. The dyers also make considerable use of soot, for a dun-colour.

SOPE, or SOAP. See SOAP.

SOPHI, or SOFI, a title given to the emperor of Persia; importing as much as wise, sage, or philosopher. There is no prince in the world whose authority is more absolute than that of the sophi of Persia.

SOPHIA is also a city of Turky, in Europe, in the province of Bulgaria: east long. 24°, north lat. 42° 30'.

SOPHISM, *σοφισμα*, in logic, *&c.* an argument which carries much of the appearance of truth, and yet leads into error.

There is some need of a particular description of these fallacious arguments, that we may with more ease and readiness detect and solve them.

1. The first sort of sophism is called ignoratio elenchi; or a mistake of the question. 2. The next sophism is called petitio principii, or a supposition of what is not granted. 3. That sort of fallacy which is called a circle, is very near a-kin to the petitio principii. 4. The next sort of sophism is called non causa pro causa, or the assignation of a false cause. 5. The next is called fallacia accidentis, or a sophism, wherein we pronounce concerning the nature and essential properties of any subject, according to something which is merely accidental to it. 6. The next sophism borders upon the former; and that is when we argue from that which is true, absolutely, simply, and abstracted from all circumstances: this is called, in the schools, a sophism *a dicto secundum quid ad dictum simpliciter*. This sort of sophism has also its reverse; as, when we argue from that which is true, simply and absolutely, to prove the same thing true in all particular circumstances whatsoever. 7. The sophisms of composition and division come next to be mentioned. The sophism of composition is, when we infer any thing concerning ideas in a compound sense, which is only true in a divided sense. The sophism of division is, when we infer the same thing concerning ideas in a divided sense, which is only true in a compounded one. This sort of sophism is committed when the word *all* is taken in a collective and distributive sense, without a due distinction. It is the same fallacy, when the universal word *all*, or *no*, refers to species in one proposition, and to the individuals in another. 8. The last sort of sophisms arises from our abuse of the ambiguity of words, which is the largest and most extensive kind of fallacy; and, indeed, several of the former fallacies might be reduced to this head. When the words or phrases are plainly equivocal, they are called sophisms of equivocation. This sophism, as well as the foregoing, and all of the like nature, are solved by shewing the different senses of the words, terms, or phrases.

But, where such gross equivocations and ambiguities appear in arguments, there is little danger in imposing on ourselves or others; the greatest danger, and what we are perpetually exposed to, in reasoning, is, where the two senses or significations of one term are near a-kin, and not plainly distinguished; and yet are sufficiently different in their sense to lead us into great mistakes, if we are not watchful. And, indeed, the greatest part of controversies, in the sacred or civil life, arise from the different senses that are put upon words, and the different ideas conveyed by them.

There is, after all these, another sort of sophism, which is wont to be called an imperfect enumeration or a false induction, when, from a few experiments or observations, men infer general theorems and universal propositions.

SOPHIST,

SOPHIST, a perſon who uſes ſophiſms, with a view to deceive thoſe he would perſuade or convince. See the preceding article.

SOPHISTICATION, the adulterating any thing with what is not good or genuine; a practice too common in the making up medicines for ſale; as alſo among vintners, diſtillers, and others, who are accuſed of ſophiſticating their wines, ſpirits, oils, &c. by mixing with them cheaper and coarſer materials: and, in many caſes, the cheat is carried on ſo artfully as to deceive the beſt judges. See WINE, SPIRIT, OIL, &c. and the articles HYDROMETER and HYDROSTATICAL BALLANCE.

SOPHORA, in botany, a genus of plants belonging to the *decandria monogynia* claſs, with a papilionaceous flower: its fruit is a very long and ſlender unilocular pod, containing a great many roundiſh ſeeds. It agrees in every thing with the diadelphia and papilionaceous plants, except that its ſtamina is diſtinct and ſeparate.

SOPORIFIC, or SOPORIFEROUS, MEDICINES, are thoſe capable of procuring ſleep, as opiates, &c. See OPIATES, &c.

SOPOROUS, SLEEPY or DROWSY DISEASES, are the coma, lethargy, and carus; to which ſome add the apoplexy. See COMA, LETHARGY, &c.

SOPRON, a city of lower Hungary, thirty miles ſouth of Vienna.

SORA, a town of the kingdom of Naples, fifty miles north of the city of Naples.

SORAW, a town of upper Saxony, near the confines of Sileſia: eaſt long. 15° 20′, north lat. 51° 38′.

SORBON, or SORBONNE, the houſe or college of the faculty of theology, in the univerſity of Paris; ſometimes alſo uſed for the faculty itſelf, becauſe it uſually aſſembles in the houſe of the ſorbon.

SORBUS, the SERVICE and QUICKEN-TREE, in botany, a genus of the *icoſandria-monogynia* claſs of plants, the flower of which conſiſts of five hollow and roundiſh petals; and its fruit is a ſoft, globoſe, and umbilicated berry, containing three oblong and cartilaginous ſeeds.

SORCERY, the crime of witch-craft, or divination by the aſſiſtance of evil ſpirits. See the article WITCH-CRAFT.

SORET, a province of the hither India, lying northwards of Guzerat: its chief town is Jaganat.

SOREX, the SHREW-MOUSE, in zoology. See the article SHREW.

SORGUM, a plant called by Linnæus holcus. See the article HOLCUS.

SORITES, in logic, a ſpecies of reaſoning, in which a great number of propoſitions are ſo linked together, that the predicate of the one becomes continually the ſubject of the next following, till at laſt a concluſion is formed by bringing together the ſubject of the firſt propoſition and the predicate of the laſt: ſuch is the following argument, 'God is omnipotent; an omnipotent being can do every thing poſſible; a being that can do every thing poſſible, can do whatever involves not a contradiction; therefore, God can do whatever involves not a contradiction.'

This combination of propoſitions may be continued to any length we pleaſe, without in the leaſt weakening the ground upon which the concluſion reſts; and the reaſon is, becauſe the ſorites may be reſolved into as many ſimple ſyllogiſms as there are middle terms in it; and the concluſion of the laſt ſyllogiſm is univerſally found to be the ſame with the concluſion of the ſorites. See SYLLOGISM.

SORRANCE, among farriers, a malady incident to horſes; of which there are two kinds: 1. An evil counted twofold, as either an evil ſtate or compoſition of a horſe's body; which is to be obſerved either by the ſhape, number, quantity, or ſight of the member ill affected or diſeaſed. 2. It is uſed for the looſening and diviſion of an unity, which as it may change diverſely, ſo it has divers names accordingly; for if ſuch a looſening and diviſion be in a bone, then it is called a fracture; if in any fleſhy part, a wound or ulcer; if in the veins, a rupture; if in the ſinews, a convulſion or cramp; and if in the ſkin, an excoriation.

Sorrance-water is a ſolution of roman-vitriol and ſome other ingredients, in vinegar: it is much eſteemed as a remedy in many of the diſeaſes of horſes, but eſpecially the ſorrance: whence the name.

SORREL, or COMMON SORREL, *acetoſa*, in botany, a ſpecies of rumex. See the article RUMEX.

The ſeeds of this plant are eſteemed aſtringent and good in diarrhœas, dyſenteries, and hæmorrhages.

Wood-SORREL, *oxalis, oxys*, or *oxyoides*, in botany, a genus of the *decandria-pentagynia* claſs of plants; the corolla of which is divided into five parts, which cohere only by their ungues, and are erect,

obtuſe, and emarginated: the fruit is a pentagonal capſule, containing five cells, with roundiſh ſeeds.

The leaves of wood-ſorrel are of a very agreeable acid taſte, and are recommended in fevers of all kinds, and the ſcurvy: there is a conſerve of them kept in the ſhops, as a refrigerant.

SORREL-COLOUR, in the manege, is a reddiſh colour, generally thought to be a ſign of a good horſe.

SORRENTO, a city and port-town of the kingdom of Naples, eighteen miles ſouth of that city.

SORTILEGE, *ſortilegium*, a ſpecies of divination, performed by means of ſortes or lots.

The ſortes preneſtinæ, famous in antiquity, conſiſted in putting a number of letters, or even whole words, into an urn; and then, after ſhaking them together, they were thrown on the ground, and whatever ſentences could be made out from them conſtituted the anſwer of the oracle.

Another kind of ſortes conſiſted in taking ſome celebrated poet, as Homer or Virgil, and opening the book, whatever preſented itſelf firſt to the eye made the anſwer: and hence it got the name of ſortes homericæ, and ſortes virgilianæ, *&c.*

The ſuperſtitious among the antient chriſtians practiſed a ſimiliar kind of divination, by opening the Old and New Teſtament; whence it got the name of ſortes ſanctorum.

SORY, or RUSMA, in natural-hiſtory, a vitriolic mineral, formed of metalline, ſulphureous, and earthen matter; being truly an ore of blue vitriol, or of the vitriol of copper alone, there not appearing to be a grain of any thing approaching to iron in it.

It is found in looſe maſſes of different ſizes, and moſtly of a blackiſh colour, though ſometimes reddiſh or bluiſh. It is found in many parts of Turky and in Germany, where it is wrought for blue vitriol, which may be ſeparated from it by a very eaſy proceſs, by powdering the ſory, then expoſing it to a moiſt air for three or four days, and laſtly boiling it in ſix times its weight of water: for if this liquor be filtrated and evaporated in the uſual manner to a pellicle, and then ſet in a cool place to ſhoot, there will be found cryſtals of pure blue vitriol adhering to the ſides of the veſſel. See VITRIOL.

SOSPELLO, a town of Piedmont, fifteen miles north-eaſt of Nice.

SOSPIRO, in the italian muſic, denotes a pauſe equal to the time of a crotchet.

SOTERIA, in antiquity, ſacrifices offered to the gods for delivering a perſon from danger; as alſo poetical pieces compoſed for the ſame purpoſe.

SOTOVENTO ISLANDS are ſituated on the coaſt of Terra-Firma; the chief of which are Trinidad, Margaretta, Tortuga, *&c.* They are alſo called the leſſer Antilles.

SOU, or SOL, a french coin. See COIN.

SOVANA, a town of Tuſcany, in Italy, ſituated on the confines of the pope's territories, twenty-five miles weſt of Orvietto.

SOUBISE, a town of Guienne, in France, ſituated on the river Charente, ſeventeen miles ſouth of Rochelle.

SOUGH, among miners, denotes a paſſage dug under ground, to convey off water from mines. See MINE.

SOVERAIGN, *ſupremus*, ſtrictly ſpeaking, ſignifies the Supreme Being, or God. See the article GOD.

SOVERAIGN, in matters of government, is applied to the ſupreme magiſtrate, or magiſtrates, of an independent government or ſtate; by reaſon their authority is only bounded by the laws of God, of nature, and the fundamental laws of the ſtate: ſuch are kings, princes, *&c.*

SOVERAIGN is alſo an appellation given to the ſupreme courts of judicature. See the article COURT.

SOUILLAC, a town of Guienne, in France, thirty-two miles north of Cahors: eaſt long. 1° 12′, north lat. 45°.

SOUL, *anima*, in philoſophy, a ſpiritual ſubſtance, which animates the bodies of living creatures: it is the principle of life and activity within them. See the articles ANIMAL, LIFE, SPIRIT, *&c.*

Various have been the opinions of philoſophers concerning the ſubſtance of the human ſoul. The epicureans thought it a ſubtle air, compoſed of their atoms, or primitive corpuſcles. The ſtoics, on the contrary, maintained it was a flame, or portion of heavenly light. And the carteſians make thinking the eſſence of the ſoul. Others, again, hold, that man is endowed with three kinds of ſoul, *viz.* the rational, which is purely ſpiritual, and infuſed by the immediate inſpiration of God; the irrational or ſenſative, which being common to man and brutes, is ſuppoſed to be formed of the elements; and laſtly, the vegetative ſoul, or principle of growth and nutrition, as the firſt is of underſtanding, and the ſecond of animal life.

Lord

Lord Bacon obſerves, that there are many excellencies in the human ſoul above thoſe of brutes; and that where ſo many and ſuch great excellencies are found, a ſpecific difference ſhould always be made. Hence he highly diſapproves of the confuſed and promiſcuous manner of philoſophers in treating of the functions of the human ſoul, as if it differed in degree rather than kind from the ſouls of brutes. However, he allows, that the doctrine concerning the rational ſoul of man muſt be deduced from revelation: for as its ſubſtance, in its creation, was not formed out of the maſs of heaven and earth, but immediately inſpired by God; and as the laws of the heavenly bodies, together with thoſe of our earth, make the ſubject of philoſophy, ſo no knowledge of the ſubſtance of the rational ſoul can be had from philoſophy. But he might have ſaid the ſame of corporeal ſubſtances, ſince, as Mr. Locke juſtly obſerves, we have no idea of one more than of the other. See ESSENCE.

It is only from the primary, or eſſential, qualities of body, *viz.* extenſion, ſolidity, *&c.* that we form an idea of it; and why may we not frame the complex idea of a ſoul, or ſpirit, from the operations of thinking, underſtanding, willing, *&c.* which are experiments in ourſelves? This idea of an immaterial ſubſtance is as clear as that we have of a material one: for though this notion of immaterial ſubſtances may be attended with difficulties, we have no more reaſon to deny or doubt of its truth, than we have to deny or doubt of the exiſtence of the body. See EXISTENCE.

That the ſoul is an immaterial ſubſtance appears from hence, that its primary operations of willing and thinking have not only no connection with the known properties of body, but ſeem plainly inconſiſtent with ſome of its moſt eſſential qualities. For the mind not only diſcovers no relation between thinking, and the motion and arrangement of parts; but it likewiſe perceives that conciouſneſs, a ſimple act, can never proceed from a compounded ſubſtance, capable of being divided into many parts. To illuſtrate this, let us only ſuppoſe a ſyſtem of matter endowed with thought; then either all the parts of which this ſyſtem conſiſts, muſt think, which would make it not one but a multitude of diſtinct conſcious beings: or its power of thinking muſt ariſe from the connection of the parts one with another, their motion and diſpoſition, *&c.* which, all taken together, contribute to the production of thought. But it is evident that the motion of parts, and the manner of combining them, can produce nothing but an artful ſtructure and various modes of motion. Hence all machines, however artfully their parts are put together, and however complicated their ſtructure, tho' we conceive innumerable different motions, variouſly combined, and running one into another with an endleſs variety, yet never produce any thing but figure and motion. If a clock, or watch, tells the hour and minutes of the day, it is only by the motion of the different hands, pointing ſucceſſively at the different figures marked on the hour-plate for that purpoſe. We never imagine this to be the effect of thought or intelligence, nor conceive it poſſible, by any refinement of ſtructure, ſo to improve the compoſition as that it ſhall become capable of knowledge and conſciouſneſs: and the reaſon is plainly, that thought being ſomething altogether different from motion and figure, without the leaſt connection between them, it can never be ſuppoſed to reſult from them. See MATTER, MOTION, and FIGURE.

This then being evident, that intelligence cannot ariſe from an union or combination of unintelligent parts; if we ſuppoſe it to belong to any ſyſtem of matter, we muſt neceſſarily attribute it to all the parts of which that ſyſtem is compoſed; whereby, inſtead of one, we ſhall, as was before obſerved, have a multitude of diſtinct conſcious beings. And becauſe matter, how far ſoever we purſue the minuteneſs of its parts, is ſtill capable of repeated diviſions, even to infinity; it is plain, that this abſurdity will follow us through all the ſuppoſitions that make thought inherent in a material ſubſtance. Wherefore, as conſciouſneſs is incompatible with the coheſion of ſolid ſeparable parts, we are neceſſarily led to place it in ſome other ſubſtance, of diſtinct nature and properties; and this ſubſtance we call ſpirit, which is altogether diſtinct from body, nay, and commonly placed in oppoſition to it: for which reaſon the beings of this claſs are called immaterial; a word that implies nothing of their true nature, but merely denotes its contrariety to that of matter. See MATTER and SPIRIT.

As to the immortality of the human ſoul, the arguments to prove it may be reduced to the following heads: 1. The nature of the ſoul itſelf, its deſires, ſenſe of moral good and evil, gradual increaſe in knowledge and perfection, *&c.* 2. The moral attributes of God.

Under the former of theſe heads it is urged, that the ſoul, being an immaterial intelligent ſubſtance, as has been already proved, does not depend on the body for its exiſtence; and therefore may, nay, and muſt, exiſt after the diſſolution of the body, unleſs annihilated by the ſame power which gave it a being at firſt; which is not to be ſuppoſed, as there are no inſtances of annihilation in nature. This argument, eſpecially if the infinite capacity of the ſoul, its ſtrong deſire after immortality, its rational activity and advancement towards perfection, be likewiſe conſidered, will appear perfectly concluſive to men of a philoſophical turn; becauſe nature, or rather the God of nature, does nothing in vain.

But arguments drawn from the latter head, *viz.* the moral attributes of the Deity, are not only better adapted to convince men unacquainted with abſtract reaſoning, but equally certain and concluſive with the former: for as the juſtice of God can never ſuffer the wicked to eſcape unpuniſhed, nor the good to remain always unrewarded; therefore, arguments drawn from the manifeſt and conſtant proſperity of the wicked, and the frequent unhappineſs of good men in this life, muſt convince every thinking perſon, that there is a future ſtate wherein all will be ſet right, and God's attributes of wiſdom, juſtice, and goodneſs fully vindicated. We ſhall only add, that had the virtuous and conſcientious part of mankind no hopes of a future ſtate, they would be of all men moſt miſerable: but as this is abſolutely inconſiſtent with the moral character of the Deity, the certainty of ſuch a ſtate is clear to a demonſtration.

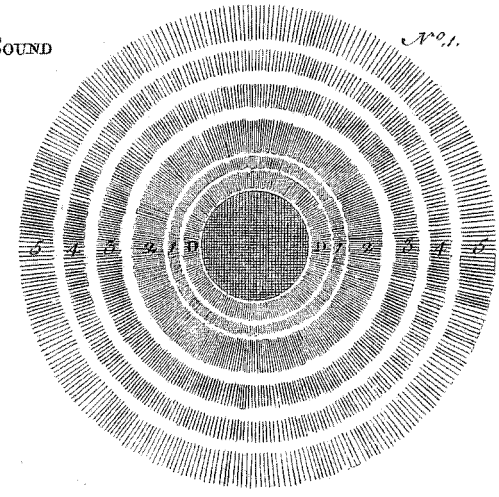
SOUND, *ſonus*, a ſimple perception, or idea, communicated to the ſoul, by means of the ear, which is the primary organ of hearing. See EAR.

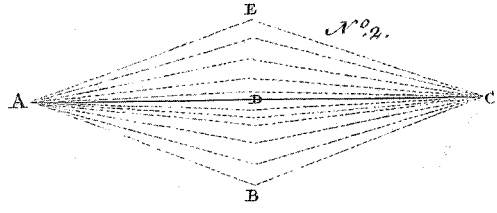
Sound is cauſed by an undulatory, or wave-like, motion of the air, ariſing from the tremulous motion of the parts of any ſonorous body when ſtruck upon; for thoſe undulations, or pulſes, of the air, beating on the tympanum or drum of the ear, convey by the auditory nerves the ſenſation of ſound to the mind. See the article HEARING.

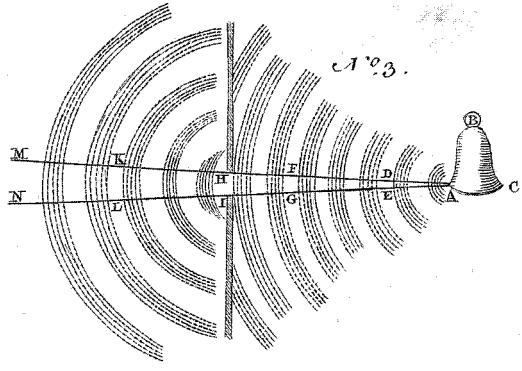
For that ſound has a neceſſary dependence on the the air, is proved by the experiment of the bell in an exhauſted receiver; and the parts of a ſonorous body being put into motion by percuſſion, excite concentric vibrations in the air all around the ſaid body; ſo that let a perſon be any how, or any where, ſituated within the verge of thoſe motions, and he will equally hear the ſound, at equal diſtances from the body whence it comes. See plate CCLVII. fig. 1. n° 1. where D D repreſents a drum, and D 1, 2, 3, 4, 5, *&c.* the circular pulſes of the air, made by, and conveying the ſound of, the beats to our ears. For the particles of air contiguous to the ſonorous body, being compelled by the firſt impulſe to move forewards, propel thoſe next to them, and theſe, others again, and ſo on to a conſiderable diſtance, according to the intenſity of the percuſſive force. But when the particles of the ſonorous body make the ſecond part of the vibration, by returning back again, the particles of air alſo, by their repulſive power, repel each other towards their proper places, and thus again expand themſelves. Now ſince motion, once generated in elaſtic bodies, continues ſome time before it can be deſtroyed by the reſiſtance and counter-action of contiguous bodies, it follows, that the particles of the ſonorous body, and conſequently thoſe of the adjacent air, have for ſome time a reciprocal vibratory motion, by going forewards and backwards through very ſmall ſpaces in indefinitely ſmall portions of time; which motion gradually decreaſes till it be totally deſtroyed. To illuſtrate this, let A C (*ibid.* n° 2.) be an elaſtic ſtring or chord, fixed at the points A and C; and let it be drawn out of its natural poſition A C, into another, A B C, upon which, being let go, it will, by its elaſticity, not only fly back to its firſt poſition A C, but into another A E C, near as far on the other ſide A C, as A B C was on the firſt: after this it will return again almoſt to B, and then return almoſt to E; and theſe courſes and recourſes of the ſtring growing ſtill leſſer and leſſer, it will at laſt ſettle in its firſt and natural poſition A D C.

When the chord begins its motion at firſt from B, it ſtrikes the particle of air contiguous to it; and that will, by its approach

Fig. 1. Sound







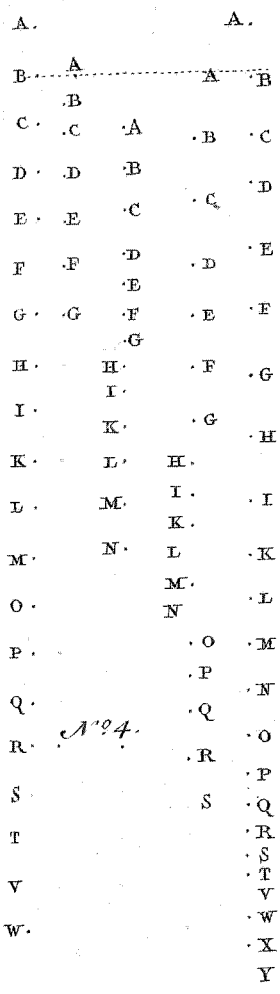
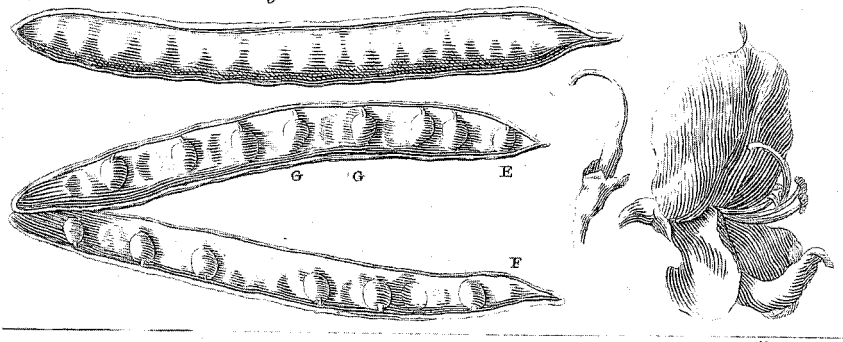


Fig. 2. Spartium, Spanish Broom



T. Jefferys sculp

proach towards the next particle, affect it, by means of its repulsive power, which keeps all the particles at equal distances from each other; and so on, through such a number of particles as can receive the motion while the string moves from B to D. Let, therefore, A, B, C, D, E, F, G, &c. (*ibid.* n° 4.) represent such a series of particles of air, at an equal distance, and the first particle A contiguous to the middle point B of such a string, and agitated by it in its motion. The string beginning to move, all the particles A, B, C, will begin to move forwards also; and, since this motion is propagated in time, let E be the remotest particle moved, while the chord is moving from B to D; during which time the chord, having an accelerated motion, will cause the particles to approach each other with an accelerated motion likewise; and because those accelerated approaches begin at A, and reach to E, in the time the chord is going from B to D, therefore the distance AB will be less in BC, and this less than CD, and that less than DE, and the distance EF will begin to be lessened, when the string is arrived at the site ADC, and the particles A, B, C, D, E, F, &c. will have the arrangement represented in the second line. But now the chord, having acquired the situation ADC, will be no farther accelerated, but on the contrary retarded, as it will now go on from D to E; the effect of which, upon the particles of air before it will be as follows: they will all go on forwards till the chord comes to E, and the particle A to its situation in the third line; but since the force upon A begins to abate, as the string begins to move from D, the elastic force now between A and B will, by acting both ways, continue to accelerate the motion of B, and retard that of A. Thus the distance BC will still diminish, till B comes to lie equi distant between A and C; and C will be accelerated till it be equi-distant between B and D, and so on. So that, as the acceleration is continued forwards, the distances will diminish towards F; and, by the time the chord is arrived at E, the particles EE will be at their nearest distance. And, since the motion of A is continually retarded, it will lose what before it had gained in the same time, and will therefore now be at the same distance from B, as at first nearly. So that the particle from A to G will have the situations as represented in the third line.

The chord now returning from E to D, gives liberty to the repulsive power between A and B to separate them to a greater distance than in their natural state, and which they at present have. By this means all the other intervals, BC, CD, DE, EF, will increase, and become successively greater than the natural distance; but that excess will be lesser in each, till you come to FG, which will be equal to the natural distance at present between A and B. The motion at the same time continuing in all the particles from H to N, they will all move forwards, and the present contracted interval between H and I will succeed between all the rest, till it arrives at the particle N, when the interval MN will be the same as at present is HI. And those particles beyond N to S will, by the preceding ones, be put into the same respective distances, but in an inverse order, as those have between G and N. And the whole series, now the string is at D, will have the intervals of the particles resembling those in the fourth line.

The chord not stopping at the situation ADC, but going on to ABC, with a retarded motion, the velocity of the contiguous particle A will also be retarded, and becomes less than that of B; upon which, the distance between them will be lessened, and the more so, as the string approaches to B. Hence all the intervals, now dilated beyond their natural state, will, by degrees, contract; but gradually slower, till you come to F, where the present largest interval between A and B will be found between F and G, and that between A and B will have acquired its natural extent, when the chord is arrived at B. Then, likewise, the particles from G to N will acquire the same situation as those now have between A and G; and from N to S, the same as now is seen between G and N; and from S forwards the same as is now before the particle N, the point S being now the middle point of condensation; all which is clearly seen in the fifth line of the figure. Thus the condensation which begins at A, by the first part of the vibration, was propagated to G by the second, from thence to N by the third, and, lastly, to S by the fourth part of the whole motion of the string, in going and returning; and this extent of air, thus agitated by the chord in going

ing and returning, is called by Sir Iſaac Newton a wave, or pulſe of air. In which wave the particles from A to N are in a dilated ſtate, and from N to X in a contracted or condenſed ſtate; which two parts of the wave anſwer to the concave and convex, or low and high part of a watery wave.

As the chord goes on to make another vibration, it will not only continue to agitate the air, at preſent in motion, but will ſpread the pulſation of the air as much farther, and by the ſame degrees as before; and the like will happen after a very complete vibration of the ſtring. Thus the air being a fluid body, and the impreſſion made on any one part affecting all the particles alike around it, it is plain thoſe pulſes will be propagated in every direction all around in concentric aerial ſhells, or ſpherical waves of air.

That the motion of the pulſes in an elaſtic medium is analogous to that of waves generated in the ſurface of ſtagnant water, is evident, when we conſider that the condenſation of the parts of the elaſtic medium is in lieu of the elevation of the water; the elaſtic force effects the ſame in the medium, as gravity does in the water, and the denſeſt part of the pulſes correſponds to the higheſt part of the waves. Thus, let A B C (*ibid.* n° 3.) repreſent the ſonorous body; by the tremulous motion of its parts, it will agitate the air contiguous to every point as A, where it will be condenſed to a certain ſmall diſtance, and make a pulſe or wave of air, in the manner as has been already ſhewn. The firſt wave or pulſe will, by its elaſtic power in expanding itſelf, produce a ſecond, that a third, and ſo on; till the impreſſed motion be diffuſed through too large a quantity of air, to be any longer ſenſible.

The quantity of motion, produced by each tremor of the ſonorous body, being communicated ſucceſſively to large portions of air, the part thereof, which each particle will acquire, will conſtantly decreaſe. This decrement of the motion will be as the increment of the number of particles, which is as the ſuperficies of the ſpherical ſhell; and ſince all ſuperficies are as the ſquares of their diameters, or ſemi-diameters, therefore the force in the particles of the wave or ſhell at D is to that in the particles of the ſhell at F, as AF^2 to AD^2, that is, the force of ſound decreaſes as the ſquares of the diſtances increaſe.

It is plain the diſtance to which ſounds may be heard, will be proportional to the magnitude, or intenſity, of the ſtroke made on the tremulous body emitting the ſound; for, the greater that ſtroke is, the greater will be the agitation of the parts of the ſonorous body, and, of courſe, the greater will be the force with which they will ſtrike the particles of air. Laſtly, the greater the force is upon the air, the more cloſely will it be condenſed and expanded; hence the greater will be the ſtroke at any given diſtance on the drum of the ear, and, conſequently, the greater will be the diſtance at which the agitation of the air will be ſenſible.

The experiments are numerous by which it has been found, that ſound is audible to the diſtance of fifty, ſixty, or eighty miles: but Dr. Hearn, phyſician to the king of Sweden, tells us, that at the bombardment at Holmia, A. D. 1658, the ſound was heard to the diſtance of thirty ſwediſh miles, which make 180 of ours. And in the fight between England and Holland, A. D. 1672, the noiſe of the guns was heard even in Wales, which cannot be leſs than 200 miles.

But ſince the atmoſphere conſiſts not of pure air, but has an admixture of vapours of a different elaſticity and tone; theſe vapours will not participate of the motion of pure air, by which ſound is propagated; in like manner as an elaſtic ſtring, if ſtruck, will not move another very near it, unleſs it be under the ſame degree of tenſion, and of the ſame tone. Therefore the quantity of air producing ſound muſt be diminiſhed in proportion to the quantity of vapour, in a given ſpace; in which Sir Iſaac ſuppoſes the air is to the vapour as 10 to 1. Whence the air and vapour together in a given ſpace is to the pure air as 11 to 10.

But the velocity of the pulſes will increaſe in the ſubduplicate ratio of the diminiſhed quantity of matter, that is, in the ſubduplicate ratio of 11 to 10, or in the entire ratio of 21 to 20, (as he has ſhewn, Princip. Prop. 48. lib. II.). Therefore, if we ſay, as 20 : 21 :: 1088 : 1142; whence the real velocity of ſound (thus inveſtigated from the nature of elaſtic air by our great author) is at length found to be at the rate of 1142 feet per ſecond.

The truth and accuracy of this noble theory have been ſufficiently confirmed by experiments, particularly thoſe made by the late Rev. Dr. Derham, of which

we ſhall give ſome account by and by; but will firſt lay before the reader a view of the different eſtimates made of the velocity of ſound by ſeveral eminent philoſophers, as in the table following.

	Feet per ſecond.
The honourable Mr. Roberts	1300
The honourable Mr. Boyle	1200
Mr. Walker	1338
Merſennus	1474
The academy at Florence	1148
Royal academy at Paris	1172
Sir Iſaac Newton, Flamſtead, Halley, and Derham	1142

As no man ever had a better opportunity, ſo none could improve it with greater diligence, aſſiduity, and accuracy, in determining and ſettling the various phænomena of ſounds, than the ſo often celebrated philoſopher laſt mentioned. He proved by experiments made with the ſtrokes of a hammer, and the explоſion of a gun at the ſame time, at the diſtance of a mile, that the velocity of ſounds produced from different bodies was the ſame, or came to his ear in the ſame time.

That the motion of ſound was equable and uniform, or that it paſſed through ſpaces proportional to the times, he found by various experiments made by the explоſion of guns, at different diſtances, as appears by the following table which he has given us, where the firſt column ſhews the places at which the guns were fired; the ſecond, the number of vibrations of an half-ſecond pendulum; the third, the diſtance of places in miles and decimal parts, as meaſured by trigonometry; the fourth, the diſtances meaſured by the velocity of ſound, admitting it to be at the rate of one mile every 9 ¼ half-ſeconds.

At Hornchurch,	9	0.9875	
North Okenden church,	18½	2,004	2,000
Upminſter-mill,	22½	2,4	2,4
	23		2,48
Little Warley church,	27½	3,0	2,97
Rainham church,	33¼	3,58	3,59
Alvel-mill,	33	3,58	3,57
Dagenham-mill,	35	3,85	3,78
Southweal church,	45	4,59	4,86
Eaſt Thornden church,	46½	5,09	5,03
Barking church,	70½	7,7	7,62
Guns at Blackheath,	116	12,5	12,55

The great exactneſs of meaſuring diſtances by ſounds appears from the above table, as well as the equability of the motion; but to render this matter ſtill more certain and indiſputable, the Dr. took a journey to Foulneſs-ſands, on the coaſt of Eſſex, which form a ſmooth large plain for miles. On this plain he meaſured ſix miles in a right line, and, cauſing a gun to be fired at the end of each mile, he found that his former obſervations were very juſt and true, and that ſound paſſed the firſt mile in 9 ¼ half-ſeconds, two miles in 18½, three miles in 27¾, and ſo on to the end of the ſix.

The Academia del Cimento made experiments of this ſort, from which they concluded, that the velocity of ſounds was ſo far equable, as not to be accelerated or retarded by conſpiring or adverſe winds; but in this they led themſelves and many others into a very great miſtake, which was owing to their firing of guns at too near a diſtance; for in great diſtances the difference is ſenſible.

SOUND, in muſic. The principal affection of ſound, whereby it becomes fitted to produce harmony, and raiſe agreeable ſenſations, is that whereby it is diſtinguiſhed into acute and grave; the cauſe of which appears to be no other than the different velocity of the vibrations of the ſounding body. See the articles HARMONY, TUNE, &c.

SOUND, in geography, denotes in general any ſtreight, or inlet, of the ſea, between two head-lands. However, the name ſound is given, by way of eminence, to the ſtreight between Sweden and Denmark, joining the german Ocean to the Baltic, being about four miles over.

SOUND-BOARD, in an organ, is a reſervoir into which the wind, drawn in by the bellows, is conducted by a port-vent, and hence diſtributed into the pipes placed over holes in its upper part: this wind enters them by valves, which open by preſſing upon the ſtops or keys; after drawing the regiſters, which prevent the air from entering any of the pipes, except thoſe it is required in.

SOUNDING, in navigation, is the trying the depth of the water, and the quality of the bottom, either by an inch or three-quarter rope, with a deep ſea-lead at the end of it. The ſounding line or rope, is marked at two, three and four fathoms, with a piece of black leather betwixt the ſtrands; and, at five fathoms, with a piece of white leather, or cloth. The plummet, or lead, is uſually in the form of a nine-pin, and weighs eighteen pounds; and its lower end is frequently greaſed, to know whether the bottom is ſandy, rocky, &c. Near banks, ſhores, &c. they ſound continually.

SOUP, or SOOP, a kind of pottage made of bread and broth, or the juice of fleſh, or ſome other matters, uſually ſerved at the beginning of a meal.

Soup is eſteemed eſſential to a french dinner, ſometimes they heighten the reliſh by the addition of onions, or leeks, or cabbage, &c.

SOURCE. See the article SPRING.

SOURIS, in the menage, is a cartilage in the noſtrils of a horſe, by means of which he ſnorts. See SNORT.

SOUTH, in coſmography, one of the four cardinal points. See the article COMPASS.

SOUTHAM, a market-town of Warwickſhire, ſituated ſeven miles ſouth-eaſt of Warwick.

SOUTHAMPTON, a borough and port-town of Hampſhire, ſituated on a bay of the engliſh channel, twelve miles ſouth-weſt of Wincheſter. It ſends two members to parliament.

SOUTHERN-WOOD, *abrotanum*, in botany, a ſpecies of artemiſia. See the articles ABRATANUM and ARTEMISIA.

Southern-wood is an attenuant, and is ſerviceable in all obſtructions of the viſcera, and in deſtroying worms. It is recommended in ſuppreſſions of urine, a dram of it in powder for a doſe; and a decoction of it is in repute with ſome as a lotion for the recovering hair upon the head when fallen off; others recommend its juice as a great cleanſer and healer of old ulcers.

SOUTHMOULTON, a market-town of Devonſhire, ſituated twenty-four miles north-weſt of Exeter.

SOUTHPETHERTON, a market-town of Somerſetſhire, ſituated twenty-two miles ſouth of Wells.

SOUTHWARK, a borough of Surry, and a ſuburb to London, with which it has a communication by a magnificent bridge. It is ſituated on the ſouth-ſide of the Thames, and ſends two members to parliament.

SOUTHWELL, a market-town of Nottinghamſhire, ſituated eight miles north-eaſt of Nottingham.

SOUTHWOULD, a port-town of Suffolk, ſituated on a bay of the german Sea, forty-two miles eaſt of Bury.

SOUVIGNY, a town of France, in the province of Lyonois, and territory of Bourbonois, ſituated fifty miles ſouth-eaſt of Bourges.

SOW, in zoology, the female of the hog-kind. See the article HOG.

SOW, in the iron-works, the name of the block or lump of metal they work at once in the iron-furnace. The ſize of theſe ſows of iron is very different, even from the ſame workmen, and the ſame furnace. Theſe furnaces having ſand-ſtones for their hearths and ſides up to the height of a yard, and the reſt being made of brick, the hearth by the force of the fire is continually growing wider, ſo that if it at firſt contains as much metal as will make a ſow of ſix or ſeven hundred weight, it will at laſt contain as much as will make a ſow of two thouſand weight.

SOWING, in huſbandry, &c. See the articles SEED, SEMINATION, &c.

One great article in ſowing to advantage, Mr. Tull obſerves, is to know exactly at what depth the ſeed may be laid without danger of burying it. Seed is ſaid to be buried, when it is laid at a depth below what it is able to come up at. Different ſorts of ſeeds come up at different depths, ſome ſix inches and more, and others will not bear to be buried at more than half an inch. For coming at an accurate knowledge of the depth at which every ſeed will come up beſt from the ſowing, Mr. Tull propoſes to make gages; for the method of conducting which, we refer the reader to his own account of it, in page 58, of his Horſe-hoeing huſbandry.

However, it is to be obſerved, that it is not proper to ſow the ſeeds of all plants at the greateſt depths at which they will come up; for it may be ſo deep as that the wet may rot or chill the firſt root, as is the caſe with wheat in moiſt land. The nature of the land, and the manner how it is laid, either flat or in ridges, and the ſeaſon of ſowing, with the

the experience of the husbandman, must determine the proper depths for different sorts of seed.

The quantity of seed is to be different also, according to the manner of the sowing. The proper quantity to be drilled on an acre is much less than must be sown in the common way, not because hoeing will not maintain as many plants as the other, for on the contrary, it will maintain many more; but the difference is upon many other accounts, as that it is impossible to sow it so even by hand as the drill will do. For let the hand spread it never so exactly, which yet is difficult enough to do with some seeds in windy weather, yet the unevenness of the ground will alter the situation of the seeds, the greatest part of them rebounding into holes, and the lowest places; or else the harrows, in covering, drawing them down thither; so that these low places may have ten times too much seed, and the high places may have little or none of it; and this inequality lessens in effect the quantity of the seed, because fifty seeds in room of one will not produce so much as one will do, and where they are too thick, they cannot be well nourished, their roots not spreading to near their natural extent, for want of hoeing, to open the earth and give them way.

The distances of the rows is one extremely material point in the obtaining a good crop; but as a much larger distance is to be allowed in these than common practice has been used to, it is very difficult to persuade the farmer to venture a trial at such distances as he may have experience from.

SOWNE, a term used in the exchequer, where estreats that sowne not, are such as the sheriff by his care and diligence cannot levy, wherefore they are not regarded; and the estreats that sowne, are such as he may levy.

SPA, or SPAW, a town of Germany, in the circle of Westphalia, and bishopric of Liege, situated seventeen miles south-east of Liege, famous for its mineral waters ever since the time of the Romans, of which there are still great quantities sent abroad to all parts of Europe.

Spaw waters are the lightest and most subtil of all the mineral waters, as is proved by several experiments, and the small quantity of earth, and the large portion of subtile mineral spirit they contain, bespeak their possessing the most exalted virtues of all the other mineral waters. One very remarkable virtue of this water is, that it greatly relieves in all disorders of the kidneys, ureters and bladder, whether occasioned by stone, gravel, or ulcerations. It possesses, beside, all the virtues of the other mineral waters, and is of the greatest service in edulcorating sharp, and dividing viscous, humours, and removing all diseases arising from these causes, by disposing them to pass off by proper emunctuories. See the article MINERAL *waters*.

These waters drank at the spring, cause a sort of drunkenness, which does not last above a quarter of an hour; when carried to any distant place, though ever so well stopped down, they will always, after some time, precipitate a small quantity of a yellow ochreous earth; mixed with milk, they do not coagulate it, but when mixed with wine, make a great ebulition, and throw up a large quantity of air-bubbles, with a peculiarly pleasing smell.

SPACE, *spatium*, is defined by Mr. Locke, to be a simple idea, which we attain both by our sight and touch. The modes whereof are distance, capacity, extension, duration, *&c.* See the articles DISTANCE, CAPACITY, *&c.*

Space considered barely in length, between two bodies, is the same idea which we have of distance. If it be considered in length, breadth, and thickness, it is properly called capacity; when considered between the extremities of matter which fills the capacity of space, with something solid, tangible, and moveable, it is then called extension, so that extension is an idea belonging to a body, but space, it is plain, may be conceived without it. Each different distance is a different modification of space, and each idea of any different space is a simple mode of this idea: such are an inch, foot, yard, *&c.* which are the ideas of certain stated lengths, which men settle in their minds for the use, and by the custom of measuring. When these ideas are made familiar to mens thoughts, they can repeat them as often as they will, without joining to them the idea of body, and frame to themselves the ideas of feet, yards, or fathoms, beyond the utmost bounds of all bodies, and by adding these still one to another, enlarge their idea of space as much as they please. From this power of repeating any idea of distance without ever coming to an end, we come

by the idea of immenſity. See the article IMMENSITY.

Another modification of ſpace is taken from the relation of the termination of the parts of extenſion, or circumſcribed ſpace, amongſt themſelves; and this is what we call figure. This, the touch diſcovers in ſenſible bodies, whoſe extremities come within our reach; and the eye takes, both from bodies and colours, whoſe boundaries are within its view; where obſerving how the extremities terminate, either in ſtreight lines, which meet at diſcernible angles; or in crooked ones, wherein no angles can be perceived: by conſidering theſe as they relate to one another in all parts of the extremities of any body or ſpace, it has that idea we call figure, which affords to the mind infinite variety. See FIGURE.

Another mode belonging to this head is, that of place. See PLACE.

There is another mode of ſpace, the idea of which we get from the fleeting and perpetually periſhing parts of ſucceſſion, which we call duration. See the article DURATION.

Space is uſually divided into abſolute and relative. Abſolute ſpace is that conſidered in its own nature, without regard to any thing external, which always remains the ſame, and is infinite and immoveable.

Relative ſpace, is that moveable dimenſion, or meaſure of the former, which our ſenſes define by its poſitions to bodies within it, and this is the vulgar uſe for immoveable ſpace.

Relative ſpace in magnitude and figure, is always the ſame with abſolute; but it is not neceſſary it ſhould be ſo numerically; as if you ſuppoſe a ſhip to be, indeed, in abſolute reſt, then the places of all things within her will be the ſame, abſolutely and relatively, and nothing will change its place: but ſuppoſe the ſhip under ſail or in motion, and ſhe will continually paſs through new parts of abſolute ſpace; but all things on board, conſidered relatively in reſpect to the ſhip, may be, notwithſtanding, in the ſame places, or have the ſame ſituation and poſition in regard to one another.

Proper and abſolute motion is defined to be the application of a body to different parts of abſolute, that is, infinite and immoveable ſpace. The carteſians, who maintain extenſion the eſſence of matter, aſſert, that the ſpace any body takes up is the ſame thing with the body itſelf; and that there is no ſuch thing as mere ſpace void of all matter in the univerſe. See CARTESIAN and VACUUM.

SPACE, in geometry, denotes the area of any figure, or that which fills the interval or diſtance between the lines that terminate it.

SPACE, in mechanics, the line a moveable body, conſidered as a point, is conceived to deſcribe by its motion.

SPADE, an inſtrument for digging up the ground, the handle or ſhaft whereof is about three feet long; the head is all of iron; the upper part being flat for the workman to ſet his foot on, to force it into the ground; the length of the head is about a foot or fifteen inches, and the breadth ſix or eight.

SPAGIRIC ART, *ars ſpagirica*, a name given by authors to that ſpecies of chemiſtry which works on the metals, and is employed in the ſearch of the philoſopher's ſtone.

SPAHI'S, horſemen in the ottoman army, chiefly raiſed in Aſia. The great ſtrength of the grand ſeignior's army conſiſts in the janizaries, who are the foot, and the ſpahi's, who are the horſe.

SPAIN, including Portugal, is a large peninſula of Europe, lying between 10° weſt and 3° eaſt longitude, and between 36° and 44° north latitude, being about ſeven hundred miles in length from eaſt to weſt, and about five hundred in breadth from north to ſouth: it is bounded by the bay of Biſcay, on the north; by the Pyrenean mountains, which ſeparate it from France, on the north-eaſt; by the Mediterranean-ſea, on the ſouth-eaſt; and by the Atlantic-ocean, on the weſt. See PORTUGAL.

The kingdom of Spain, conſidered ſeparately from Portugal, comprehends fourteen provinces, each of which may be ſeen under its proper name.

New SPAIN. See MEXICO.

SPALATTO, a city and port-town of Dalmatia, ſituated on the gulph of Venice: eaſt long. 17° 45′, north latitude 43° 16′.

SPALDING, a market-town of Lincolnſhire, ſituated under the meridian of London, thirty miles ſouth eaſt of Lincoln.

SPAN, a meaſure taken from the ſpace between the thumb's end and the tip of the little finger, when both are ſtretched out. The ſpan is eſtimated at three hand's breadths, or nine inches. See MEASURE.

SPANDAW, a town of Germany, in the circle of Upper Saxony, and marquiſate

of

of Brandenburg, ſituated on the river Havel, eight miles north-weſt of Berlin.

SPANIEL, in zoology, a ſpecies of the canis or dog-kind. See CANIS.

There are two ſorts of ſpaniels which neceſſarily ſerve for fowling: the firſt of theſe finds game on land, and the other on the water. Such ſpaniels as play their parts by land, do it either by ſwiftneſs of foot, by ſpringing the bird, or by diſcovering to the fowler, by ſome ſecret ſign, the place where the game lights; they ſerve the hawk and the net, or train. See the article SETTING.

The water-ſpaniel, partly by natural inclination, and partly by being well trained, has recourſe to the water for his game, and by this means moſt of the water-fowl are taken. The ſize of this ſpaniel is ſomewhat larger than the other, but he is generally remarkable for long rough curling hair, which muſt be clipped at proper times, to render him more light for ſwimming.

SPAR, in natural hiſtory, a claſs of foſſils, not inflammable nor ſoluble in water; when pure, pellucid and colourleſs, and emulating the appearance of cryſtal, but wanting its diſtinguiſhing characters; compoſed of plane and equable plates, not flexile nor elaſtic; not giving fire with ſteel; readily calcining in a ſmall fire, and fermenting violently with acids, and wholly ſoluble in them. See the article CRYSTAL.

The ſpars, in general, are found in the fiſſure of ſtones, and about mines. Derbyſhire affords enough of them to ſupply the whole world; and the german mines afford yet larger quantities.

If cryſtal be ſubject to a vaſt variety of appearances, ſo as to conſtitute different orders and genera, ſpar is much more ſo, there being no leſs than ten orders of it. 1. The pellucid, cryſtalliform and perfect ſpars, compoſed of a column terminated at each end by a pyramid. 2. Thoſe compoſed of two pyramids joined baſe to baſe, without any intermediate column. 3. The cryſtalliform columnar ſpars, adhering by one end to ſome ſolid body, and terminated at the other by a pyramid. 4. The pyramidal cryſtalliform ſpars without columns. 5. The ſpars of a parallelopiped form. 6. The ſpars externally of no regular form, but breaking into rhomboidal maſſes. 7. The cruſtaceous ſpars; theſe are of a cryſtallino-terrene ſtructure, or debaſed from their native pellucidity by an admixture of earth, and formed into plates or cruſts of a ſtriated figure within. 8. The cruſtaceous terrene ſpars; bodies ſo highly debaſed with earth, as to appear merely earthy, of an irregular ſtructure, and not ſtriated within: theſe often encruſt fiſſures of ſtone, and ſometimes vegetable and other extraneous bodies in ſprings. 9. The ſpars formed into oblong cylindric bodies, known by the name of ſtalactitæ, or ſtony icicles. 10. The ſpars formed into ſmall round figures, compoſed of various cruſts encloſing one another, and generally known by the name ſtalagmitæ: and adding to theſe the ſpars, influenced in their figures by metalline particles, we have the whole ſeries of theſe bodies, *viz.* 1. The cubic ſpars, owing their figure to lead. 2. The pyramidal ſpars, with four planes, owing their figure to tin. 3. The rhomboidal ſpars, conſiſting of ſix planes, owing their figure to iron.

For medicinal uſe, the pureſt and moſt pellucid ſpars ſhould be choſen: theſe perfectly diſſolve in acids, and are recommended in nephritic caſes. Some have uſed one kind, ſome another, as the lapis judaicus, the ſparry incruſtations of caverns, petrified oyſter-ſhells, and water in which large quantities of ſpar are ſuſtained. After all, the nephritic virtues of ſpar want ſufficient proof; ſome even ſuſpect its uſe to be more hurtful than beneficial.

It were to be wiſhed, that whoever attempts to aſcertain this point, would chooſe for the experiment ſome determinate kind of ſpar in its natural form, rather than under appearances, whereby its efficacy may be confounded with that of other bodies.

SPARADRAP, *ſparadrapum*, in pharmacy, *&c.* a ſort of cere-cloth, called alſo tela Gualteri, the form whereof is directed as follows. Take of the diapalma plaiſter, and diachylon with the gums, each one pound; ceruſs, half a pound; root of orris finely powdered, an ounce and a half. Mix theſe together, and whilſt they are in fuſion, dip them in ſoft worn-out linnen-rags, ſo that they may be covered with the plaiſter on each ſide; then take them out, ſpread them, and let them dry; and ſmooth the ſurfaces with a knife or ſpatula. The principal uſe of theſe is for iſſues.

SPARAGUS, or ASPARAGUS, in botany. See the article ASPARAGUS.

SPAR-

SPARGANIUM, COMMON BUR-REED, in botany, a genus of the *monoecia-triandria* claſs of plants, having no corolla; the male and female flowers have a roundiſh amentum; the calyx of the male is formed of two leaves, and that of the female of three; the fruit is a dry drupe, turbinated with a point, and angulated underneath; the ſeeds are two oſſeous, oblongo-ovated and angulated nuts.

The root of this plant is recommended by Dioſcorides as excellent againſt the poiſon of ſerpents, when taken in wine.

SPARRING, among cock-fighters, is the fighting a cock with another to breathe him. In ſparring they put hotts on their ſpurs that they may not hurt one another. See the article HOTTS.

To ſpar the cock in general, ſignifies to breathe him, in order to embolden him to fight.

SPARROW, *paſſer*, in ornithology, a ſpecies of the fringilla. See FRINGILLA.

The common ſparrow is the brown fringilla, with a black throat and brown temples. It is larger than the linnet, and the male is an erect and handſome bird; the head is large, the eyes ſmall, and the beak ſhort; the wings are ſhort, and the tail ſhort and forked.

The reed ſparrow, or the fringilla with a black head, brown at the ſides, and with a white ring round the neck, and a mottled black and white breaſt, is a very beautiful and ſingular bird, of the ſize of the common linnet; the head is ſmall and depreſſed, the beak ſhort and black, and the eyes hazel; and in moſt other particulars it correſponds with the common ſparrow. See plate CCLVI. fig. 4. where n° 1. repreſents the cock, and n° 2. the hen.

SPARROW-HAWK, in ornithology, the yellow-leged falco with a white undulated breaſt, and a faſciated brown tail. See the articles FALCO and HAWK.

This bird is about the bigneſs of a pigeon, but conſiderably longer bodied, in proportion to its thickneſs; its wings, when expanded, meaſure twice the length of the body and tail; the tail is ſhort but very ſtrong, thick at the baſe, very ſharp at the point, and conſiderably hooked; the head is ſmall, ſomewhat flatted, and of a browniſh colour; the eyes are as it were ſunk in the head, and their iris is yellow and bright.

SPARSE LEAVES, among botaniſts, leaves which are placed irregularly over the ſeveral parts of the plant.

SPARTEL CAPE, a promontory of the coaſt of Barbary, at the entrance of the ſtraits of Gibraltar.

SPARTIUM, SPANISH BROOM, in botany, a genus of the *diadelphia-decandria* claſs of plants, the corolla whereof is papilionaceous, and the fruit is a long, cylindric, obtuſe pod of two valves: the ſeeds are numerous, globoſe, and kidney-ſhaped. See plate CCLVII. fig. 2.

SPARTIUM is alſo Tournefort's name for the geniſta of Linnæus, as geniſta is Linnæus's name for Tournefort's ſpartium. See GENISTA.

SPARTIVENTO CAPE, the moſt ſouthern point or promontory of Italy, ſituated in eaſt long. 16° 30′, north lat. 38° 20′.

SPARUS, in ichthyology, the name of a genus of fiſh of the order of the acanthopterygii, the characters of which are, that the coverings of the gills are ſcaly, with lips covering the teeth in the ſame manner as in quadrupeds; the teeth themſelves are either like thoſe of the human head, or like thoſe of a dog; the molares are like thoſe of quadrupeds; the teeth ſtand only in the jaws and fauces; the palate and the tongue are ſmooth; there is only one back-fin; the tail is forked, and the eyes covered with a lax ſkin.

SPASM, *ſpaſma*, or *ſpaſmus*, in medicine, a convulſion. See CONVULSION and CONVULSIVE DISORDERS.

A ſpaſm, according to Hoffman, may be univerſal or particular, ſalutary or morbous. An univerſal ſpaſm happens if the whole vaſcular genus, chiefly the heart and arteries, as alſo the fibres of the ſyſtem, are affected, and there is a preternatural conſtriction therein, whereby the ſyſtole and diaſtole are increaſed, and the progreſs of the blood accelerated; this conſtitutes a fever, whereof a frequent pulſe is the moſt certain ſign. The other kind of ſpaſms is particular, and affects only one part of the body, which it conſtringes, and intercepts the free progreſs of the blood, rendering it unequal, and ſending it in greater plenty to the other parts of the body. But particularly this ſpaſtic affection affects the nervous and membranous parts, ſuch as the ſtomach, and the whole volume of the inteſtines; whence proceed the hyſteric and hypochondriac paſſions. A ſpaſm is likewiſe preſent in hæmorrhages, congeſtions of the blood, and unequal flux of the fluid in all anxieties and ſuppreſſed

preſſed excretions. See HYPOCHONDRIAC, HYSTERIC, HÆMORRHAGE, &c.

If a violent ſpaſm happens to affect the dura mater, an epilepſy or univerſal convulſion follows; and convulſive motions of the membranes and nerves have their origin from the medulla ſpinalis. A ſpaſm is ſalutary when it deſtroys the cauſe of the diſeaſe, by taking away the ſtagnation of the humours, correcting acid cauſtics, and promoting the excretion of the morbid matter; but it is very pernicious when it conſtringes the ſkin and all the excretory veſſels, detaining the morbous matter therein, and forcing it upon the vital parts. The cauſes and treatment of ſpaſms in general, have already been treated of under the articles CONVULSION and CONVULSIVE DISORDERS.

In a ſpaſm of the lower jaw, when the patient can neither open his mouth nor eat; as when perſons are wounded, and ſomething foreign is lodged therein, or when the nerves are hurt, or when ſharp things, ſuch as vitriol, are applied to ſtop the blood, the cure muſt be performed according to the diverſity of the cauſes as particularly treated of in ſurgery; but when this happens ſpontaneouſly in infants, it is obſerved that they generally die, though the beſt nervous and antiſpaſmodic medicines be uſed.

In the cynic ſpaſm, or as it is otherwiſe called, the ſardonian laughter, if it proceeds from poiſons, as it generally does, eſpecially hemlock or oenanthe, Heiſter directs that they be expelled immediately from the body by a vomit; then giving generous wines, warm with ginger or pepper, as was the practice of the antients. If it happens from other cauſes, it muſt be treated with antiſpaſmodics and nervous medicines, both inwardly and outwardly, and chiefly with plaſter of betony and bayberries prepared with oil of amber, and applied to the temples, and behind the ears.

For that ſpecies of convulſion called cramp, ſee the article CRAMP.

SPASMODIC, ſomething belonging to a ſpaſm or convulſion. See the laſt article.

SPATHA, a word uſed by different authors in various ſenſes; among botaniſts it expreſſes that ſort of cup which conſiſts of a ſimple membrane growing from the ſtalk; this kind of cup is of various figures, often diphyllous, or divided into two parts; often ſimple; ſometimes more divided: it incloſes ſometimes a ſingle flower, ſometimes ſeveral flowers together, and theſe have often no perianthium; the ſpatha is of very different texture and conſiſtence in different plants. See plate CCLVIII. fig. 1.

Some authors, by this word, expreſs a rib; others, the chirurgical inſtrument called ſpatula; others, a ſort of inciſion-knife, and by others it is taken for a ſword, this laſt being, indeed, its proper ſignification, and all the reſt being only metaphorical applications of it to different things, which bear ſome reſemblance to a ſword.

SPATULA, or SPATHULA, an inſtrument uſed by ſurgeons and apothecaries. This inſtrument is made of different ſhapes, according to the various uſes of it: that marked n° 1. plate CCLVI. fig. 5. is uſed to depreſs the tongue in order to examine the ſtate of the tonſils, uvula and fauces, when they are affected with any diſorders: it is alſo uſed to ſuſpend the tongue when the frenum is to be divided, for which purpoſe it has a fiſſure at its extremity, and ſhould therefore be made of ſilver rather than any other metal: thoſe marked n° 2 and 3. *ibid.* are chiefly uſed in ſpreading plaſters, ointments, and cataplaſms, and ſometimes with their fulcated extremity they are of ſervice in raiſing up fractured bones of the cranium.

SPAVIN, in the manege, a diſeaſe in horſes, being a ſwelling or ſtiffneſs uſually in the ham occaſioning a lameneſs. There are two kinds of ſpavins, *viz.* the ox-ſpavin, which is a callous tumour at the bottom of the ham on the inſide, hard as a bone, and very painful; while it is yet recent, ſome only hault with it at the firſt coming out of the ſtable: the other, which is the dry ſpavin, is more eaſily perceived by the horſe's raiſing one of his hind legs with a twitch higher than the other; but ſometimes it is found on both legs. This kind, which ſome alſo call ſtring-halt, frequently degenerates into the ox-ſpavin, for which there is no remedy but to apply the fire, and even this is not always ſucceſsful.

There are two other kinds of ſpavin which have their ſeat in the hoof, *viz.* the blood-ſpavin, being a ſoft tumour which grows through the horſe's hoof, and is uſually full of blood; the other is the bone-ſpavin, being a cruſty ſubſtance growing on the inſide of the hoof under the joint.

SPAW, or SPA. See the article SPA.

SPAYING,

SPAYING, or SPADING, the operation of caſtrating the females of ſeveral kinds of animals, as ſows, bitches, &c. to prevent any further conception, and promote their fattening.

It is performed by cutting them in the mid flank, on the left-ſide, with a ſharp knife or lancet, taking out the uterus and cutting it off, and ſo ſtitching up the wound, anointing the part with tar, and keeping the animal warm for two or three days. The uſual way is to make the inciſion aſlope two inches and a half long, that the fore-finger may be put in towards the back to feel for the ovaries, which are two kernels as big as acorns on both ſides of the uterus, one of which is drawn to the wound, the ſtring thereof cut, and thus both taken out.

SPEAKER *of the houſe of commons*, a member of the houſe elected by a majority of the votes thereof, to act as chairman or preſident in putting queſtions, reading briefs or bills, keeping order, reprimanding the refractory, adjourning the houſe, &c.

The firſt thing done by the commons, upon the firſt meeting of a parliament, is to chuſe a ſpeaker, who is to be approved of by the king, and who, upon his admiſſion, begs his majeſty that the commons, during their ſitting, may have free acceſs to his majeſty, freedom of ſpeech in their own houſe, and ſecurity from arreſts. The ſpeaker is not allowed to perſuade or diſſuade in paſſing a bill, but only to make a ſhort and plain narrative; nor to vote unleſs the houſe be equally divided. See PARLIAMENT.

The lord chancellor or keeper is uſually ſpeaker of the houſe of lords; the ſpeaker of the convocation is called the prolocutor. See the article PROLOCUTOR.

SPEAKING, the art or act of expreſſing one's thoughts in articulate ſounds or words.

SPEAKING TRUMPET. See TRUMPET.

SPEAR, in the manege. The feather of a horſe, called the ſtroke of the ſpear, is a mark in the neck or near the ſhoulders of ſome barbs and ſome turky and ſpaniſh horſes, repreſenting the blow or cut of a ſpear in theſe places, with ſome reſemblance of a ſcar; this feather is an infallible ſign of a good horſe.

SPECIAL, ſomething that is particular, or has a particular deſignation, from the Latin *ſpecies*, in oppoſition to general from *genus*. See GENERAL, &c.

SPECIAL *matter in evidence*, in law, denotes that which is alledged ſpecially, and does not come into the general iſſue.

SPECIALTY, is uſed for a bond, bill, or other deed or inſtrument executed under the hand and ſeal of the partiest hereto.

SPECIES, in logic, a relative term, expreſſing an idea which is comprized under ſome general one, called a genus. See the article GENUS.

The idea of a ſpecies is formed, by adding a new idea to the genus: thus if the genus be a circumſcribed ſpace, and we ſuppoſe this circumſcription to be by lines, we ſhall obtain the notion of that ſpecies of figures which are called plain figures; but if we conceive the circumſcription to be by ſurfaces, we get an idea of the ſpecies of ſolid figures. This ſuperadded idea is called the ſpecific difference, not only as it ſerves to diſtinguiſh the ſpecies from the genus; but becauſe being different in all the ſeveral ſubdiviſions, we thereby alſo diſtinguiſh the ſpecies one from another: and as this ſuperadded conception completes the notion of the ſpecies, it is plain that the genus and ſpecific difference are the proper and conſtituent parts of the ſpecies. If we trace the progreſs of the mind ſtill farther, and obſerve it advancing through the inferior ſpecies, we ſhall find its manner of proceeding to be always the ſame; ſince every lower ſpecies is formed, by ſuperadding ſome new idea to the ſpecies next above: thus if animal be the genus, by ſuperadding the notion of four limbs, we obtain the idea of quadrupeds; if to this we add farther, the peculiar form and characters which diſtinguiſh mankind, we get the idea of the human ſpecies; and by adding the peculiarities which diſtinguiſh a particular perſon from all others, we form the notion of an individual, which is called the laſt ſpecies, or ſpecies ſpecialiſſimum.

For the uſe of the genus, ſpecies, and ſpecific difference in defining things, ſee the article DEFINITION.

SPECIES, in logic, is one of the five words called by Porphyry univerſals. See the article UNIVERSAL.

SPECIES, in rhetoric, is a particular thing, contained under a more univerſal one.

SPECIES, in optics, the image painted on the retina, by the rays of light reflected from the ſeveral points of the ſurface of an object. See the article VISION.

SPECIES, in commerce, are the ſeveral pieces of gold, ſilver, copper, &c. which, having paſſed their full preparation and

coinage, are current in public. See the article COIN.

SPECIES, in algebra, the characters or ſymbols made uſe of to repreſent quantities. See the article CHARACTER.

SPECIES, in pharmacy, denotes the ingredients of a compound medicine, as the diaſcordium in a dry form, or only reduced powder. See DIASCORDIUM.

The ſpecies aromaticæ, according to the Edinburgh-diſpenſatory, conſiſt of equal parts of canella, leſſer cardamom-ſeeds, mace and ginger, reduced to powder: but the college of phyſicians, London, order them to be made of cinnamon, two ounces; and leſſer cardamom-ſeeds huſked, ginger and long pepper, of each one ounce, all beat together into a powder. Both theſe compoſitions are agreeable, hot, ſpicy medicines; and as ſuch may be uſefully exhibited in cold phlegmatic habits and decayed conſtitutions, for warming the ſtomach, promoting digeſtion, and ſtrengthening the tone of the viſcera in general. The doſe is from ten grains to a ſcruple and upwards.

Change of SPECIES, in huſbandry, is the ſowing firſt one kind of plant, then another, and then a third, and ſo on, upon the ſame land: by this means the moſt is made of the ſoil; and it is found, when it will no longer give a good crop of the firſt corn planted on it, that it will ſtill give a good one of ſome other ſpecies; and, finally, of peaſe after all. After this laſt change of ſpecies, it is found neceſſary, in the common method of huſbandry, to renew the land with fallowing and manure, in order to its producing any thing again.

SPECIFIC, in philoſophy, that which is peculiar to any thing, and diſtinguiſhes it from all others.

SPECIFIC, in medicine, a remedy whoſe virtue and effect is peculiarly adapted to ſome certain diſeaſe, is adequate thereto, and exerts its whole force immediately thereon.

The illuſtrious Hoffman has given a curious account of ſpecific medicines, but it is too long to be inſerted here.

SPECIFIC GRAVITY, is that by which one body is heavier than another of the ſame dimenſion, and is always as the quantity of matter under that dimenſion. See the article GRAVITY.

As to the method of finding the ſpecific gravities of bodies, ſee HYDROMETER and HYDROSTATICAL BALLANCE.

SPECILLUM, in ſurgery, the ſame with ſpeculum. See SPECULUM.

SPECIOUS ARITHMETIC, the ſame with algebra. See the article ALGEBRA.

SPECTACLES, in dioptrics, a machine conſiſting of two lenſes, ſet in ſilver, horn, *&c.* to aſſiſt the defects of the organ of ſight. See LENS.

Old people, and others who have flat eyes, uſe convex ſpectacles, which cauſe the rays of light to converge ſo as to fall upon the retina: whereas myopes, or ſhort-ſighted perſons, uſe concave lenſes for ſpectacles, which cauſing the rays to diverge, prevent their meeting ere they reach the retina. The convexity or concavity of the glaſſes, ſuited to the different degrees of flatneſs or convexity of people's eyes, is beſt determined by trial; obſerving only to uſe thoſe glaſſes which are the leaſt convex or concave of any, that will fit the eye: for ſince they cannot be put quite cloſe to the eye, the leſs any glaſs is convex or concave, the leſs it will magnify or diminiſh the pictures of objects upon the retina. See VISION and MYOPIA.

Were there no other uſe of dioptrics, than that of ſpectacles for defective eyes, the advantage that mankind receives thereby is certainly inferior to none other whatſoever, that is not abſolutely requiſite to the ſupport of life; for as the ſight is the moſt noble of all our ſenſes, ſurely that inſtrument that relieves the eyes when decayed, and ſupplies their defects, rendering them uſeful when otherwiſe almoſt uſeleſs, muſt needs, of all others, be eſteemed of the greateſt advantage.

The antients knew nothing of ſpectacles, the invention of which is ſaid to have been about the year 1300.

Spectacles, without caſes, pay, on importation, a duty of 6 s. $7\frac{5}{10}$ d. for each groſs, containing twelve dozen; and draw back, on exportation 5 s. $2\frac{25}{100}$ d.

SPECTRE-SHELL, *concha ſpectrorum*, a ſpecies of voluta, variegated with ſeveral reddiſh faſciæ or bands. See the article VOLUTA.

SPECULARIS LAPIS, in natural hiſtory, a genus of talcs, compoſed of large plates viſibly ſeparate, and of extreme thinneſs; and each fiſſile again ſeparated into a number of plates ſtill finer. See TALC.

Of this genus there are three ſpecies: 1. The white ſhining ſpecularis, with large and broad leaves, commonly called iſin-

glaſs and muſcovy-glaſs: its lamellæ, or leaves, are extremely thin, elaſtic, and tranſparent; it makes not the leaſt effervescence with aqua fortis, and is not eaſily calcined in the fire. It is imported in great quantities; the miniature-painters cover their pictures with it; the lantern-makers ſometimes uſe it inſtead of horn; and minute objects are uſually preſerved between two plates of it, for examination by the microſcope. 2. The bright brown ſpecularis, with broad leaves; a very valuable ſpecies, though inferior to the former. 3. The purple bright ſpecularis, with broad leaves; which is the moſt elegant of all the talcs, and not leſs beautifully tranſparent than the firſt kind.

SPECULATIVE, ſomething relating to the theory of ſome art or ſcience, in contradiſtinction to practical. See the article THEORY.

SPECULUM, a LOOKING-GLASS, or MIRROUR, capable of reflecting the rays of the ſun, &c. See the articles MIRROUR, LIGHT, REFLECTION, &c.

SPECULUM, in ſurgery, an inſtrument for dilating a wound, or the like, in order to examine it attentively.

Theſe ſpecula are of different figures, according to the parts they are intended to ſearch: 1. The ſpeculum ani (plate CCLVIII. fig. 2. n° 1.) ſerves to dilate and inſpect the anus, vagina, and uterus, in diſorders of theſe parts; it conſiſts of a hollow cone or beak, whoſe two ſides are marked A A and B B, which, being gently warmed and lubricated with oil, are then preſſed into the anus or vagina; and by preſſing together the two handles C and D, the ſides of the cone are thereby gradually ſeparated, and dilate the parts for inſpection. the hinge E, is in manner of a ginglymus. 2. The ſpeculum oculi, the deſcription and uſe of which may be ſeen under the article COUCHING. 3. The ſpeculum oris, for inſpecting the mouth, is almoſt like a pair of forceps; A (*ibid.* n° 2.) being the part that depreſſes the tongue, while the parts B, B, elevate the dentes inciſores of the upper jaw, by preſſing the handles C, C, together. *Ibid.* n° 3. is another ſpeculum oris, furniſhed with a ſcrew, to open the teeth in convulſions; A A being the parts interpoſed between the dentes inciſores, and which are opened by means of the ſcrew B.

SPEECH, in general, the art or act of expreſſing a perſon's thoughts, by means of articulate ſounds, which we call words. See the article WORD.

Grammarians generally make eight parts of ſpeech, *i. e.* eight kinds of words, generally uſed in diſcourſe, *viz.* noun, pronoun, participle, adverb, prepoſition, interjection, and conjunction; each of which ſee under its proper article.

Others, particularly engliſh grammarians, refer all words to four general heads or claſſes, *viz.* 1. Such words as denote things actually exiſting, or their properties, which are called nouns or names, as *houſe, tree, man, horſe, convenient, large, &c.* 2. Such words as expreſs action or paſſion, as *I love, I am loved*; and theſe are called verbs or affirmations. 3. Such words as denote the manner or way of doing or ſuffering, as *ſwiftly, ſlowly, &c.* which are called adverbs. 4. Particles, or ſuch ſmall words as ſerve to connect others together, in forming a ſentence, as *and, or, alſo, before, after, &c.* See the articles PARTICLE, NOUN, VERB, &c.

SPEEDWELL, *veronica*, in botany. See the article VERONICA.

SPELL, in general, denotes the ſame with charm or amulet. See the articles CHARM and AMULET.

In the ſea-language, the word ſpell ſignifies to do any work for a ſhort time, and then leave it; therefore, a freſh ſpell is when freſh men come to work; and to give a ſpell, is to work in another's room.

SPELLING, in grammar, that part of orthography which teaches the true manner of reſolving words into their ſyllables. See the article ORTHOGRAPHY.

All words are either ſimple or compound, as *uſe, diſuſe*; *done, undone*: and the rules for dividing each, muſt be ſuch as are derived from the analogy of language in general, or from the eſtabliſhed cuſtom of ſpeaking; which, for the engliſh language, are reduced to the following rules: 1. A conſonant between two vowels muſt be joined with the latter in ſpelling, as *na-ture, ve ri-ly, ge-ne-rous*: except, however, the letter *x*, which is joined to the firſt, as in *flax-en, ox-en, &c.* and compound words, as in *up-on, un-uſed, &c.* 2. A double conſonant muſt be divided, as in *let-ter, man-ner, &c.* 3. Thoſe conſonants which can begin a word, muſt not be parted in ſpelling, as in *de-fraud, re-prove, di-ſtinct*: however, this rule is found ſometimes to fail; for tho'

gn begins a word, as *gnaw*, *gnat*, &c. yet it muſt be divided in ſpelling, as in *cog-ni-zance*, *ma-lig-ni ty*, &c. 4. Thoſe conſonants which cannot begin a word muſt be divided, as *ld* in *ſel-dom*, *lt* in *mul-ti-tude*, *mp* in *tem-per*, *rd* in *ar-dent*; but, in final ſyllables, there are exceptions, as *tl* in *ti-tle*, *dl* in *han-dle*, &c. 5. When two vowels come together, and are both of them diſtinctly ſounded, they muſt be ſeparated in ſpelling, as in *co-e-val*, *mu-tu-al*, &c. 6. The grammatical terminations, or endings, muſt be ſeparated in ſpelling, as *ed* in *wing-ed*, *edſt* in *de-li-ver edſt*, *ing* in *hear-ing*, *ance* in *de-li-ver-ance*, &c. 7. Compound words muſt be reſolved into their ſimple or component words, as *up-on*, *in-to*, *never-the-leſs*, *not-with-ſtand-ing*, &c.

SPELTER, in natural hiſtory, the ſame with zinc. See the article ZINC.

SPENT, in the ſea-language, ſignifies the ſame as broken.

SPERGULA, SPURRY, in botany, a genus of the *decandria-pentagynia* claſs of plants, the flower of which conſiſts of five oval, concave, patent petals; and its fruit is an oval, covered, unilocular capſule, formed of five valves, and containing numerous rounded ſeeds, ſurrounded with an emarginated rim.

SPERM, σπέρμα, the ſame with ſeed. See the article SEED.

SPERMA-CETI, in pharmacy, a white flaky ſubſtance, prepared from the oil of a ſpecies of whale, called by ichthyologiſts catodon, by reaſon it has teeth only in the under jaw. See CATODON.

The ignorance of the people who firſt uſed this medicine, gave it a name which ſeemed to expreſs its being the ſemen of the whale; but it is, in reality, no more than a preparation of the oil, with which that fiſh abounds.

Sperma-ceti is a fine, bright, white, and ſemi-pellucid ſubſtance, compoſed of a fine furfuraceous ſubſtance, formed into oblong flakes, very light, ſoft, and unctuous to the touch, inflammable, ſoluble in oil, but not in watery menſtrua; of ſcarce any ſmell, when freſh and fine, and of a ſoft, agreeable, and unctuous taſte. The largeſt, firmeſt, and whiteſt flakes of it are to be choſen. It is liable to become rancid and yellowiſh in keeping, and the ſmaller fragments contract this bad quality ſooner than the larger.

The ſperma-ceti of the ſhops was firſt made from the head of this fiſh; the oil obtained from its brain, and the diploe of the cranium, furniſhing all that we had of it; and hence the conſiderable price it was long kept at. It was ſome time after found out, however, that any whale-oil would do as well as this, which occaſioned the price to fall conſiderably. At preſent it is made in England from whale-oil of any kind, the ſettlings of our oilmen's larger veſſels particularly, which are boiled with a lixivium of german pot-aſh, or pearl-aſhes, till white and firm; and after ſeveral other meltings, and a thorough ſeparation of what ſaline particles might have got into the matter, it is, when cold, cut out with knives into the flakes we ſee it in. The proceſs is eaſy, but it requires care, and a nice inſpection towards the end: if not enough boiled, it is apt to turn yellow, and ſoon grow rancid.

Sperma-ceti is, therefore oil of the animal-kind, rendered very ſweet, and fit for internal uſe. Its virtues are emollient and pectoral; it is good in coughs, and other diſorders of the breaſt; and excellent in external applications, ſuch as liniments, and the like: it readily diſſolves in oil, or other fatty ſubſtances, for the latter purpoſes; and, for the former, it blends with the yolk of an egg, and after that mixture with an aqueous fluid, and makes a pleaſant emulſion.

SPERMACOCE, in botany, a genus of the *tetrandria-monogynia* claſs of plants, the corolla whereof conſiſts of a ſingle petal; the tube is cylindric, and longer than the cup; the limb is divided into four parts, patent, reflex, and obtuſe; the fruit conſiſts of two oblong capſules, growing together, gibbous on one ſide, plane on the other, and each of them having two horns or points; the ſeeds are ſingle and roundiſh.

SPERMATIC, in anatomy, ſomething belonging to the ſperm or ſeed.

The ſpermatic veſſels, called alſo vaſa præparantia, are certain veſſels appointed for bringing the blood to the teſticles, &c. to be ſecreted and prepared into ſeed, and for carrying back again the blood remaining after the ſecretion is effected. The ſpermatic veſſels are two arteries and as many veins. The ſpermatic arteries ariſe, by a very narrow origin, from the fore part of the trunk of the aorta, below the emulgents: their ſtructure is very ſingular, in that, contrary to the fabric of all other arteries, which are largeſt at their exit from the trunk, theſe are ſmalleſt at

their origin, and grow bigger in their progreſs towards the teſtes; by this means the blood receives a check at its firſt going off for thoſe parts, which diſpoſes it for the future changes, &c. it is to paſs thro'. The ſame end is anſwered in quadrupeds, by having theſe arteries curled and contorted in their paſſage, like a ſcrew. The reaſon why nature has taken another method in man, Mr. Cowper obſerves, is, that in this caſe the abdominal muſcles muſt have been larger than they are; by which means the inteſtines would have been frequently let down into the ſcrotum; an inconvenience which quadrupeds are ſecured from, by the horizontal poſition of their bodies.

The ſpermatic arteries, in their progreſs, meeting with the ſpermatic veins, enter together with them the inner lamella of the peritonæum; where inſinuating into the duplicature of the proceſs, and being cloathed therewith, they paſs on to within three or four fingers breadth of the teſticles, where they divide into two unequal branches, the biggeſt of which goes to the teſticle, and is diſtributed therein; and the leſſer in the paraſtata or epididymis. See ARTERY, TESTICLE, and PARASTATA.

The ſpermatic veins take the ſame courſe with the arteries, only a little above the teſticles they ſplit into ſeveral branches, which uniting, form a plexus, called the corpus pampiniforme, or pyramidale. The blood returned by the ſpermatic veins, is delivered on the right ſide to the cava, and on the left into the emulgent vein. Their nerves ariſe from the plexes of the pelvis and of the loins. See VEIN, NERVE, CORPUS, &c.

SPERMATOCELE, in medicine and ſurgery, the ſame with the cirſocele, or hernia varicoſa. See the article CIRSOCELE.

SPERMATOPOEA, the name given to ſuch medicines as are ſuppoſed to increaſe the ſemen.

SPEY, a river of Scotland, which, running north eaſt, through Badenoch and Murray, falls into the German ſea, eaſt of the firth of Murray.

SPEZIA, a town of Italy, in the territory of Genoa, ſituated on a bay of the Tuſcan ſea, fifty miles ſouth-eaſt of Genoa.

SPHACELUS, in ſurgery and medicine, an abſolute and perfect corruption or death of the parts; whereby it is diſtinguiſhed from a gangrene, which is that very great and dangerous degree of inflammation, wherein the parts affected begin to corrupt and put on a ſtate of putrefaction. See GANGRENE.

In caſes of a perfect ſphacelus, or mortification, wherein the parts are become abſolutely dead, and wholly without ſenſe, and ſoft ſo as to retain the impreſſions of one's finger-end, and are plainly fetid and corrupted, all the medicines in the world will be inſufficient to reſtore the parts to life again; and all that remains to be done, is the one miſerable remedy of preſerving the reſt of the body, by cutting off that part, to prevent the mortification from ſpreading farther. A different method, however, is to be taken in this operation, according to the degree of the ſymptoms and the parts affected. If only ſome extremity of the foot, tarſus, metatarſus, ancle, or inſtep, or only the bare ſkin and fat are ſphacelated, the whole foot, in that caſe, ought not to be amputated, but preſerving the limb entire, the ſurgeon is only to remove that part which is vitiated: and Heiſter's opinion is, that this is frequently beſt of all done by ſuppuration; or elſe by cauſtic medicines. When it is to be done by ſuppuration, that is to be brought on as faſt as poſſible; and when it is done, the cruſt, or eſchar, of the ulcer is to be ſuppurated from the ſound parts with proper caution. To haſten effectually a ſuppuration in theſe caſes, nothing is ſo ſerviceable as the making numerous long and deep ſcarifications near the ſound parts; and afterwards the inciſed parts are to be well anointed with the common digeſtive ointment, and after that treated with the balſamic cataplaſms and fomentations, in common uſe on the like occaſions. A fomentation alſo ſerviceable in theſe caſes, is made by mixing, in a quart of a decoction of ſcordium, or of barley-water, vinegar of rue, ſix ounces; ſpirit of wine with venice-treacle, four ounces; and an ounce or two ounces of common ſalt; this is to be applied hot, with compreſſes, to the inciſed part, and frequently repeated till the diſorder appears to ſpread no farther, which is known to be the caſe, when the tumour of the vitiated part ſubſides, and the edges of the ſound part become tumid all round; and the ſecond or third day after this, a ſuppuration is uſually formed, and the ſound parts become gradually ſeparated from the vitiated. After this, to ſoften and promote

mote a ſpeedy ſeparation of the eſchar, the following cataplaſm is always found highly ſerviceable: take of ſcordium, two handfuls; mallows, marſh-mallows, and henbane, of each one handful; lavender-flowers, half a handful. let theſe be boiled to the conſiſtence of a cataplaſm in vinegar or oxycrate; and when in that ſtate, add to them three ounces of the flour of linſeed, one ounce of linſeed-oil, and two ounces of ſal armoniac. This is to be applied warm over the whole, and is to be retained in that condition, as long as ſhall be found neceſſary, by means of a brick boiled in water, and applied wrapped in a linnen-cloth, or ſome other like means. See SUPPURATION and FOMENTATION.

After theſe medicines have been uſed, and the whole ſurrounding ſkin is gently tumefied with redneſs, a cruſt or eſchar is then formed by degrees, and the ſound fleſh begins to ſeparate from the reſt; by this we know that the diſorder has done ſpreading, and that an entire ſuppuration of the vitiated parts will very ſhortly follow. When this ſeparation ſhews itſelf beginning, it ſhould be promoted as much as poſſible, by dreſſing the part with the common digeſtive, either alone, or mixed with venice-treacle, which muſt be retained on between the ſound and the dead parts. To make way for this, it is ſometimes neceſſary to divide them a little by the lancet; and when that is done, and the dreſſing has been applied, the before-deſcribed cataplaſm ſhould be laid on warm; and in all the ſucceeding dreſſings, whatever is found looſe of the dead part muſt be carefully removed. And if it be neceſſary, from the adheſion of the vitiated parts to the ſound, to uſe the ſciſſars, or ſcalpel, to divide them, this is always to be done with very little either of pain or danger; it will then be proper to dreſs the part with the digeſtive, and a plaſter of diachylon, or the like, over it, till the corrupted parts are entirely caſt off, and the ulcer appears perfectly well cleanſed, and the cure is then eaſily perfected in the common way.

This is the gentler and moſt common method: ſome ſurgeons, however, from the tedioufneſs of it, have recourſe directly, in theſe caſes, to the cauſtic. They anoint either the edges only, or elſe the whole of the corrupted part, every day with butter of antimony, or the cauſtic-ſtone liquified, till the living parts are ſurrounded by a ſort of eſchar, applying afterwards the cataplaſms before deſcribed, or others of the ſame kind, to prevent the diſorder from ſpreading, and to make the corrupted parts ſeparate from the ſound: the corroſive lixivium of Boerhaave is greatly in repute, and much uſed on thoſe occaſions; it is made of three ounces of very ſtrong quick-lime, mixed with nine ounces of pot-aſhes, firſt ground ſeparately to powder, and afterwards mixed, adding a little water; they are then to be put into a glaſs-veſſel, and ſet in a cellar, to run by deliquium. As ſoon as they are found to become fluid, the matter muſt be put into a filtre of coarſe paper, and the clear liquor that runs through, muſt be kept for uſe. It is to be uſed by dipping a bruſh, or feather into it, and rubbing it over the part affected, once or twice a day; or fine linnen-rags may be wetted with it, and applied all over the part, not forgetting, however, at the ſame time, the uſe of the fore-mentioned cataplaſm: this application is to be continued till the corrupted matter begins to caſt off in cruſts or ſcales; and when this is the caſe, it muſt be dreſſed with the common digeſtive; and, when perfectly cleanſed, healed with a vulnerary balſam.

Another cauſtic highly commended by Belloſte in theſe caſes, is made by diſſolving one part of crude mercury, in two parts either of ſpirit of nitre, or of aqua fortis: this is to be rubbed over the parts as the former, and will occaſion a ſpeedy ſeparation.

Finally, when the ſphacelus is ſo deeply affixed in any part of the upper or lower extremity, that it has penetrated through the muſcles ſo far as the bone, and has either reſiſted the force of all medicines, or the proper times for applying them has been neglected, in this caſe, to preſerve the reſt of the body, the injured part muſt be amputated. See AMPUTATION.

SPHÆRANTHUS, in botany, a genus of the *ſyngeneſia-polygamia-neceſſaria* claſs of plants, the general corolla whereof conſiſts of hermaphrodite corollulæ in the center, and the female ones in the verge of the flower; the proper hermaphrodite one is monopetalous, funnel-ſhaped, and open, and quinquifid at the limb; there is ſcarce any female corolla; there is no pericarpium; the receptacle is naked; the ſeed is ſingle, oblong, and naked.

SPHÆROCARPUS, in botany, a genus of the *cryptogamia* claſs of plants, conſiſting of foliaceous

foliaceous matter, expanded on the ground and producing very large and obvious fructifications. Dr. Hill thinks it probable, that the male flowers are produced on ſeparate plants from the female, and have not been diſcovered to belong to the ſame ſpecies: no male parts of fructification are deſcribed to us; the female parts conſiſt of a tubulated and inflated vagina, within which are contained a large globular capſule, containing a great number of ſmall, looſe ſeeds.

SPHÆROMACHIA, *σφαιρομαχια*, in antiquity, a particular kind of boxing, wherein the combatants had balls of ſtone, or lead, in their hands, which were called *σφαιραι*; hence the ſeventh part of the gymnaſium, where this exerciſe was practiſed, was called the ſphæriſterium.

SPHAGNUM, in botany, a genus of the *cryptogamia-muſcorum* claſs of plants, conſiſting of ſtalks furniſhed with leaves, and of capſules, in ſome reſpects reſembling thoſe of the bryum, but without any calyptræ, and ſtanding on ſo ſhort pedicles, that they do not appear to have any. Dr. Hill ſays, that the pedicles which ſupport the capſules, grow in many of the ſpecies from the ſummits of the ſtalk; but Linnæus ſuppoſes it to be ſo in all, and makes it a part of the generical character.

SPHENOIDAL SUTURE, in anatomy, a ſuture thus called from its encompaſſing the os ſphenoides, which it ſeparates from the os frontis, the os petroſum, and the os occipitis. See SKULL, and the next article.

SPHENOIDES, or OS CRUCIFORME, in anatomy, the ſeventh bone of the cranium, or ſkull. See SKULL.

This bone is fixed in manner of a wedge among the other bones of the cranium, and ſerves as a baſis, as it were, to ſupport ſeveral of them, and ſome of thoſe of the upper jaw: the figure of this bone is very irregular; in its upper part is ſeen the ſella equina, or turcica, under which there is a ſinus; this is ſometimes double, and opens into the noſtrils; ſometimes it is totally wanting: it is called the ſphenoidal ſinus. The ſphenoides has thirteen apophyſes; ſix of them are internal, and are placed near the ſella equina; and the other ſeven are external; four of theſe are of a pterygoide form, and thence named pterygoide apophyſes; two of the other three are very ſmall and ſtyloide, and the ſeventh is placed under the vomer: there are alſo three foſſæ, or cavities, in this bone, one in the ſella equina, and the other between the pterygoide apophyſes.

SPHENOPHARYNGÆUS, in anatomy, a pair of muſcles, called alſo the pterygopharingæus. See PTERYGOIDÆUS.

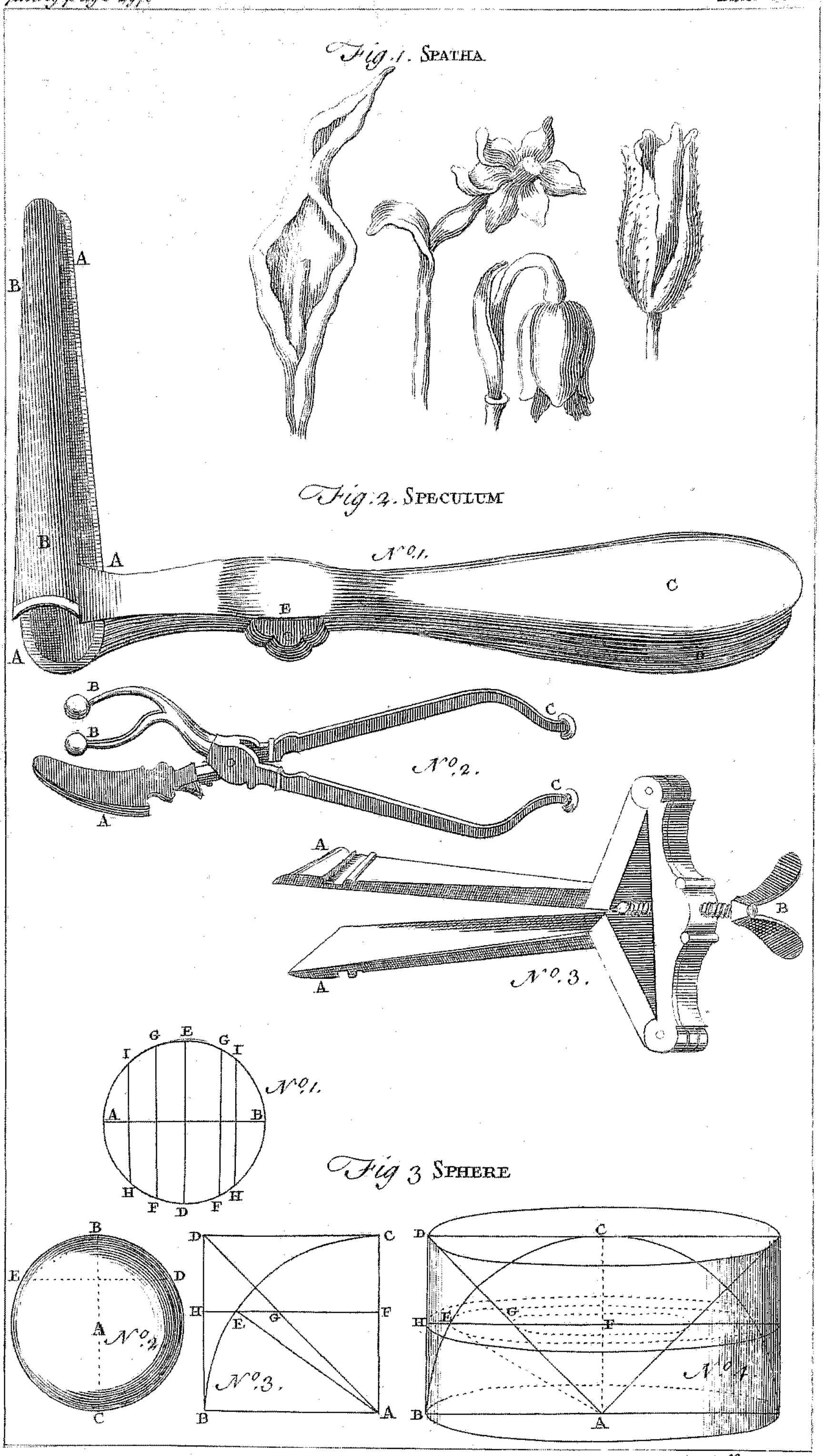
SPHENOSTAPHYLINUS, in anatomy, a muſcle of the larynx. It deſcends from a round fleſhy origination, near the root of a proceſs of the os ſphenoides, and from thence runs obliquely to the uvula, and is inſerted into its hinder and upper part, where it joins its partner. It ſerves to draw the uvula upwards and backwards, and hinders the maſticated aliment from paſſing into the foramina narium, in deglutition.

SPHERE, *ſphæra*, *σφαιρα*, is a ſolid contained under one uniform round ſurface, ſuch as would be formed by the revolution of a circle about a diameter thereof, as an axis. Thus the circle AEBD (plate CCLVIII. fig. 3. n° 1.) revolving about the diameter AB, will generate a ſphere, whoſe ſurface will be formed by the circumference of the circle.

Definitions. 1. The center and axis of a ſphere, are the ſame as the center and diameter of the generating circle: and as a circle has an indefinite number of diameters, ſo a ſphere may be conſidered as having alſo an indefinite number of diameters, round any one of which the ſphere may be conceived to be generated. 2. Circles of the ſphere are thoſe circles deſcribed on its ſurface, by the motions of the extremities of the chords ED, FG, IH, *&c.* at right angles to AB; the diameters of which circles are equal to thoſe chords. 3. The poles of a circle on the ſphere, are thoſe points on its ſurface, equally diſtant from the circumference of that circle: thus A and B are the poles of the circles deſcribed on the ſphere by the ends of the chords ED, FG, IH, *&c.* 4. A great circle of the ſphere is one equally diſtant from both its poles; as that deſcribed by the extremities of the diameter ED, which is equally diſtant from both its poles A and B. 5. Leſſer circles of the ſphere are thoſe which are unequally diſtant from both their poles; as thoſe deſcribed by the extremities of the chords FG, HI, *&c.* becauſe unequally diſtant from their poles A and B. See the article CIRCLE.

Axioms. 1. The diameter of every great circle paſſes through the center of the ſphere; but the diameters of all leſſer circles do not paſs through the ſame center: hence alſo the center of the ſphere is

the



T. Jefferys sculp

the common center of all the great circles. 2. Every ſection of a ſphere by a plane, is a circle. 3. A ſphere is divided into two equal parts, or hemiſpheres, by the plane of every great circle; and into two unequal parts, called ſegments, by the plane of every leſſer circle. 4. The pole of every great circle is 90° diſtant from it on the ſurface of the ſphere; and no two great circles can have a common pole. 5. The poles of a great circle are the two extremities of that diameter of the ſphere, which is perpendicular to the plane of that circle. 6. A plane paſſing through three points on the ſurface of the ſphere, equally diſtant from any of the poles of a great circle will be parallel to the plane of that great circle. 7. The ſhorteſt diſtance between two points, on the ſurface of a ſphere, is the arch of a great circle paſſing through theſe points. 8. If one great circle meets another, the angles on either ſide are ſupplements to each other; and every ſpherical angle is leſs than 180°. 9. If two circles interſect each other, the oppoſite angles are equal. 10. All circles on the ſphere, having the ſame pole, are cut into ſimilar arches, by great circles paſſing through that pole.

Properties of the SPHERE. 1. All ſpheres are to one another as the cubes of their diameters. 2. The ſurface of a ſphere is equal to four times the area of one of its great circles, as is demonſtrated by Archimedes in his book Of the Sphere and Cylinder, lib. i. prop. 37. hence, to find the ſuperficies of any ſphere, we have this eaſy rule; let the area of a great circle be multiplied by 4, and the product will be the ſuperficies: or, according to Euclid, lib. vi. prop. 20. and lib. xii. prop. 2. the area of a given ſphere, CEBD (*ibid.* n° 2.) is equal to that of a circle, whoſe radius is equal to the diameter of the ſphere BC. Therefore, having meaſured the circle deſcribed with the radius BC, this will give the ſurface of the ſphere. 3. The ſolidity of a ſphere is equal to the ſurface multiplied into one third of the radius: or, a ſphere is equal to two thirds of its circumſcribing cylinder, having its baſe equal to a great circle of the ſphere. Let ABEC (*ibid.* n° 3. and 4.) be the quadrant of a circle, and ABDC the circumſcribed ſquare, equal twice the triangle ADC: by the revolution of the figure about the right line AC, as an axis, a hemiſphere will be generated by the quadrant, a cylinder of the ſame baſe and height of the ſquare, and a cone by the triangle: let theſe three be cut any how by the plane HF, parallel to the baſe AB; and the ſection of the cylinder will be a circle, whoſe radius is FH; in the hemiſphere, a circle whoſe radius is FE; and in the cone, a circle of the radius FG. But EA^2 ($=HF^2$) $=$ EF^2+FA^2: but $AF^2=FG^2$, becauſe AC $=$ CD; and therefore $HF^2=EF^2+FG^2$; or the circle of the radius HF, is equal to a circle of the radius EF, together with a circle of the radius GF: and ſince this is true every where, all the circles together deſcribed by the reſpective radii HF, that is the cylinder, are equal to all the circles deſcribed by the reſpective radii EF and FG, that is, to the hemiſphere and cone taken together. But by Euclid, lib. xii. prop. 10. the cone generated by the triangle DAC, is one third part of the cylinder, generated by the ſquare BC, whence it follows, that the hemiſphere generated by the rotation of the quadrant ABEC, is equal to the remaining two thirds of the cylinder, and that the whole ſphere is two thirds of the cylinder circumſcribed about it. Hence it follows, that a ſphere is equal to a cone, whoſe height is equal to the ſemi-diameter of the ſphere, and its baſe equal to the ſuperficies of the ſphere, or to the area of four great circles of the ſphere, or to that of a circle, whoſe radius is equal to the diameter of the ſphere. See the articles CONE, CIRCLE, CYLINDER, *&c.*

Circles of the SPHERE. See CIRCLE.

Projection of the SPHERE. See PROJECTION.

Sector or ſegment of a SPHERE. See the articles SECTOR and SEGMENT.

SPHERE, in aſtronomy, that concave orb, or expanſe, which inveſts our globe, and in which the heavenly bodies appear to be fixed, and at an equal diſtance from the eye.

The better to determine the places of the heavenly bodies in the ſphere, ſeveral circles are ſuppoſed to be deſcribed on the ſurface thereof, hence called the circles of the ſphere: of theſe, ſome are called great circles, as the equinoctial, ecliptic, meridian, *&c.* and others, ſmall circles, as the tropics, parallels, *&c.* See each under its proper article.

Armillary SPHERE. See ARMILLARY SPHERE.

SPHERE *of activity of a body*, is that determinate ſpace or extent, to which, and no farther, the effluvia continually emit-

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ed from that body, reach; and where they operate, according to their nature. See the article POWER.

SPHERICAL ANGLE, TRIANGLE, and TRIGONOMETRY. See the article ANGLE, TRIANGLE, and TRIGONOMETRY.

SPHERICS, is that part of geometry which treats of the position and menſuration of arches of circles, deſcribed on the ſurface of a ſphere. See the article SPHERE.

SPHEROID, in geometry, a ſolid, approaching to the figure of a ſphere.

The ſpheroid is generated by the entire revolution of a ſemi-ellipſis about its axis, See the article ELLIPSIS.

Thus, if the ſemi-ellipſis AHFB (plate CCLIX. fig. 1. n° 1.) be ſuppoſed to revolve round its tranſverſe axis AB, it will generate the oblong ſpheroid AHFBG. Now as all circles are as the ſquares deſcribed upon their radii; that is, the circle of the radius EH, is to the circle of the radius EG, as CF^2 to CD^2, becauſe EH : EG :: CF : CD; and ſince it is ſo every where, all the circles deſcribed with the reſpective radii EH, (that is, the ſpheroid made by the rotation of the ſemi-ellipſis AFB about the axis AB) will be to all the circles deſcribed by the reſpective radii EG, (that is, the ſphere deſcribed by the rotation of the ſemi-circle ADB on the axis AB) as FC^2 to CD^2; that is, as the ſpheroid is to the ſphere on the ſame axis, ſo is the other axis of the generating ellipſis to the ſquare of the diameter or axis of the ſphere: and this holds whether the ſpheroid be formed by a revolution around the greater or leſſer axis.

Hence it appears, that the half of the ſpheroid, formed by the rotation of the ſpace AHFC, around the axis AC, is double of the cone generated by the triangle AFC, about the ſame axis. Hence, alſo, is evident the meaſure of the ſegments of the ſpheroid, cut by planes perpendicular to the axis: for the ſegment of the ſpheroid, made by the rotation of the ſpace ANHE round the axis AE, is to the ſegment of the ſphere, having the ſame axis AC, and made by the rotation of the ſegment of the circle AMGE, as CF^2 to CD^2. But the meaſure of this ſolid may be found with leſs trouble by this analogy; *viz.* as BE : AC + EB :: ſo is the cone generated by the rotation of the triangle AHE round the axis AE : to the ſegment of the ſphere made by the rotation of the ſpace ANHE round the ſame axis AE, as is demonſtrated by Archimedes of conoids and ſpheroids, prop. 34. This agrees as well to the oblate as to the oblong ſpheroid. See the articles SPHERE and SEGMENT.

A ſpheroid is alſo equal to two thirds of its circumſcribing cylinder. See the articles CYLINDER and FRUSTUM.

As to the ſuperficies of a ſpheroid, Mr. Huygens gives the two following conſtructions in his Horolog. Oſcill. For deſcribing a circle equal to the ſuperficies of an oblong and prolate ſpheroid: 1. Let an oblong ſpheroid be generated by the rotation of the ellipſis ADBE, (*ibid.* n° 2.) about its tranſverſe axis AB, and let DE be its conjugate; make DF equal to CB, or let F be one of the foci, and draw BG parallel to FD, and about the point G, with the radius BG, deſcribe an arch, BHA, of a circle; then between the ſemi-conjugate CD, and a right line equal to DE + the arch AHB, find a mean proportional, and that will be the radius of a circle equal to the ſuperficies of the oblong ſpheroid. 2. Let a prolate ſpheroid be generated by the rotation of the ellipſis ADBE (*ibid.* n° 3.) about its conjugate axis AB. Let F be one of the foci, and biſſect CF in G, and let AGB be the curve of the common parabola whoſe baſe is the conjugate diameter AB, and axis CG. Then if between the tranſverſe axis DE, and a right line equal to the curve AGB of the parabola, a mean proportional be taken, the ſame will be the radius of a circle equal to the ſurface of that prolate ſpheroid.

For the ſpheroidical figure of the earth, and the difference this muſt occaſion in the meridional parts, uſed in the projection of Mercator's chart, ſee the articles EARTH and MERIDIONAL.

SPHINCTER, in anatomy, a term applied to a kind of circular muſcles, or muſcles in form of rings, which ſerve to cloſe and draw up ſeveral orifices of the body, and prevent the excretion of the contents: thus the ſphincter of the anus cloſes the extremity of the inteſtinum rectum. It has its origin from the bottom of the os coccygis, and the ſkin that is under this bone; and its fibres, from hence ſeparating every way from one another, and ſurrounding the anus in every part, aſcend afterwards in men into the lower part of the bulb of the urethra,

urethra, or into the acceleratores muſcles which ſurround this bulb, and are there terminated. In women, they are inſerted into the lower part of the vagina of the uterus. Many fibres alſo deſcend from the interior and lower part of the os pubis, near the ſynchondroſis; and forming a body of an oval figure, and of the breadth of a man's thumb, they ſurround the extremity of the rectum; and when they act, have the ſame effect of drawing it together and cloſing it: there are indeed but few merely circular, or annular fibres, ſuch as are uſually ſaid to compoſe the ſphincter, obſerved in diſſection. See the article ANUS.

The ſphincter of the bladder is compoſed of a ſeries of tranſverſe fibres running croſswiſe, under the ſtrait fibres of the neck of the bladder, in form of a circle, and ſerving to cloſe it, to prevent the involuntary diſcharge of the urine. In men this is connected to the fibres of the inteſtinum rectum, and in women to thoſe of the vagina. See BLADDER.

The ſphincter gulæ, or, as it is otherwiſe called, the oeſophagæus, is a ſingle muſcle, which ſerves for the conſtriction of the pharynx. This riſes on each ſide of the os hyoides, and the thyroide, and the cricoide of the larynx, which ſurrounds the hinder part of the gulæ. See the article PHARYNX.

The ſphincter of the pupil of the eye appears upon the poſterior ſurface of the uvea when its blackneſs is cleared away, and is formed of circular fibres for contraction, as the ciliary fibres are for the dilatation of the pupil. See EYE.

The ſphincter of the vagina is compoſed of a ſeries of muſcular fibres ariſing from the ſphincter of the anus, and ſurrounds the orifice of the vagina; after which it is inſerted under the crura of the clitoris. For the ſphincter of the lips, ſee the article CONSTRICTOR.

SPHINX, σφίγξ, in ſculpture, &c. a figure or repreſentation of a monſter of that name, famed among the antients, now moſtly uſed as an ornament in gardens, terraces, &c. It is repreſented with the head and breaſts of a woman, the wings of a bird, the claws of a lion, and the reſt of the body like a dog. It is ſuppoſed to have been engendered by Typhon, and ſent by Juno to be revenged on the Thebans. Its office, they ſay, was to propoſe dark enigmatical queſtions to all paſſers by; and if they did not give the explication thereof, to devour them. It made horrible ravages, as the ſtory goes, on a mountain near Thebes, and could not by any means be deſtroyed, till after OEdipus had ſolved the following riddle, "What animal is it that in the morning walks on four legs, at noon on two, and at night on three?" The anſwer was "Man."

Among the Egyptians, the ſphinx was the ſymbol of religion, by reaſon of the obſcurity of its myſteries: and on the ſame account the Romans placed a ſphinx in the porch of their temples.

SPHONDYLIUM, in botany, Tournefort's name for the heracleum of Linnæus. See HERACLEUM.

SPICA VIRGINIS, a ſtar of the firſt magnitude, in the conſtellation virgo. Its place is in the more ſoutherly hand. Its longitude, according to Mr. Flamſteed, is 19° 31′ 22″: its lat. 2° 1′ 59″ ſouth.

SPICE, any kind of aromatic drug that has hot and pungent qualities: ſuch are pepper, nutmeg, ginger, cinnamon, cloves, &c. See the articles AROMATIC, PEPPER, &c.

Some alſo apply the word to divers other medicinal drugs brought from the eaſt: as ſenna, caſſia, frankincenſe, &c. See the articles SENNA, &c.

SPICE-ISLANDS, ſituated in the Eaſt-Indies. See BANDA-ISLANDS, MOLUCCAS, and CEYLON.

SPIDER, *aranea*, in zoology, an inſect of a roundiſh or elliptic figure, having eight eyes placed on the hinder part of the thorax, and having alſo eight legs. This creature has a power of ſpinning. See WEB.

The ſpecies of ſpiders are very numerous; but authors have made them more ſo, by admitting among them other inſects of a very different genera.

SPIDER-WORT, in botany. See the article PHALANGIUM.

SPIEL, in the glaſs-trade, an iron-inſtrument, hooked at the end and pointed, with which the workmen take the metal up out of the melting-pots, for proofs or eſſays, to ſee whether it be fit for work.

SPIGELBURG, a town of Germany, in the circle of Weſtphalia, capital of the county of Spigelburg: eaſt long. 9° 25′, north lat. 52° 6′.

SPIGELIA, in botany, a genus of the *pentandria-monogynia* claſs of plants, the corolla whereof conſiſts of a ſingle petal, of the ſhape of a funnel: the tube is much longer than the cup, and is narrower below than above: the pericarpium

conſiſts of two globoſe fruits, growing together, and ſituated on the cup: the ſeeds are roundiſh, very ſmall, and numerous.

SPIGNEL, in botany, the engliſh name of the plant meum. See MEUM.

SPIGNO, a town of Italy, in the dutchy of Monferrat: ſituated ſixty miles ſouth-eaſt of Turin.

SPIKE, or *oil of* SPIKE, a name given to an eſſential oil diſtilled from lavender, and much uſed by the varniſh-makers, and the painters in enamel, and of ſome uſe in medicine. It is brought from Provence, and other parts of France, where the lavender is called aſpic, and thence came the name of oil of ſpike. This oil, when in perfection, is very limpid; of a pleaſant yelloviſh colour; very fragrant; poſſeſſing, in an eminent degree, the peculiar ſmell generally admired in the flowers. In medicine it is uſed, both externally and internally, in paralytic and lethargic complaints, rheumatic pains, and debilities of the nervous ſyſtem. The doſe is from one drop to five or ſix; but our artificers, in their varniſhes, uſe more of this oil than the apothecaries do: and wanting it at a cheap rate, they have taught the druggiſts, who uſed to import and ſell it to them, ſo many ways of adulterating it, that at preſent it is ſcarce any where to be met with genuine; and ſo coarſe an ingredient as common oil of turpentine is uſed as the baſis of all the counterfeits: they alſo ſometimes adulterate it with ſpirit of wine. But both theſe cheats are eaſily diſcovered: that mixed with ſpirit of wine may be known by only mixing the whole with water, in which caſe the water, uniting with the ſpirit, leaves the oil at the top alone: that mixed with oil of turpentine, is diſcovered by burning a ſpoonful of it; for the genuine oil of ſpike burns with a clear flame and without ſmoke, and its ſmell, while burning, is very fragrant; whereas, when there is oil of turpentine mixed, it burns more furiouſly, emits a thick ſmoke, and is of a very bad ſmell. This oil is diſtilled from the ſmaller ſpecies of lavender, in the common way, by the alembic. See LAVANDULA.

SPIKENARD, *nardus*, in botany. See the article NARDUS.

Ploughman's SPIKENARD, in botany, the ſame with the conyza, or flea-bane. See the article CONYZA.

SPIKING *up the ordnance*, a ſea-phraſe, uſed for faſtening a quoin with ſpikes to the deck cloſe to the breech of the carriages of great guns, that they may keep cloſe and firm to the ſhip's ſides, and not get looſe when the ſhip rolls, and by that means endanger the breaking out of a butt-head of a plank. See QUOIN.

SPILIMBERGO, a town of Italy, in the territory of Venice, and province of Friuli, ſituated forty-five miles north of Venice.

SPILSBY, a market-town of Lincolnſhire; ſituated twenty-ſeven miles eaſt of Lincoln.

SPINA BIFIDA, in anatomy, a parting of the ſpinal proceſſes into two rows: the exiſtence of ſuch a caſe is doubted. See the article SPINE.

SPINA VENTOSA, in ſurgery and medicine, that ſpecies of corruption of the bones which takes its riſe in the internal parts, and by degrees enlarges the bone, and raiſes it into a tumour, and which, when it happens to children, is termed by Severinus, and many others, pædarthrocaces. See PÆDARTHROCACES and TUMOUR.

In the ſpina ventoſa, the caries or eroſion of the bone, is, according to Heiſter, occaſioned by a depravity of the contained fluids, and generally ariſes ſpontaneouſly, or without any external cauſes: nor does it begin upon the ſurface of the bone, but between its lamellæ, or elſe in its internal cavity; from thence it extends, by degrees, to the external parts; and at length either affects the whole bone or a greater or ſmaller part of it; expanding itſelf to different widths, and riſing to a tumour which is ſometimes hard and without pain, and at other times feels as if it were filled with wind: it is attended with a greater or leſſer degree of pain, pricking and ſhooting; at laſt it grows red, and is accompanied with other bad ſymptoms, till the diſordered bone, being by degrees corroded, the common integuments, and other ſofter parts that lay over it, remaining at firſt intire, partake of the diſorder; then foul ulcers of a very terrible ſort break out. When tumours of the bone are hard, and the ſoft parts about them are not inflated, but free from redneſs, inflammation, and pain, as is very frequently the caſe in ricketty diſorders, the bad ſymptoms juſt deſcribed ſeldom come on: this is properly the pædarthrocaces: but the painful, red, inflated tumours, happening equally to children and to adults, are the

the ſpina ventoſa. It differs from a caries, by being attended with tumour; and from an exoſtoſis, as this latter is an excreſcence of the bone, whether attended with eroſion or not. See CARIES, RICKETS, EXOSTOSIS, &c.

The ſpina ventoſa generally begins about the heads or epiphyſes of the larger bones, where they are moſt tender and ſpongy, and where the noxious matter may not only have ſufficient room to lodge in the cellular ſubſtance, but where it will alſo meet with the leaſt reſiſtance in ſoftening and expanding the parts. The os frontis is ſubject to diſorders of this kind in venereal caſes; and it is frequently ſituated in the bones of the neck, face, and breaſt.

Though this diſorder uſually ariſes from internal, yet it is ſometimes found to be owing to external cauſes, eſpecially in perſons conſtitutionally addicted to a diſorder of this kind; when the veſſels between the lamellæ of the bone, or in the medulla itſelf, are by a blow, fall, or other external violence, injured or torn. But the proximate cauſe of this diſorder is either a collection, or congeſtion, of a viſcid and thick, or of an acrimonious and corroding humour; or an inflammation ariſing in the medulla, or in the ſubſtance or cells of the bone degenerating into an abſceſs, and forming an ichor or pus. The collection of viſcid and pituitous matter, and the expanſion of the bones, ſometimes happens without pain; but the eroſion of the parts can never happen without the moſt acute pains. When the internal parts of the bones only are affected by this diſorder, the pain does not encreaſe upon external preſſure. When the pain encreaſes upon external preſſure, the external parts are brought into conſent; and when this happens, the periofteum, and parts which ſurround it, with the ſubſtance of the bone, and tunica cellularis, enlarge; from whence a ſenſation frequently ariſes as if the parts were filled with air or wind.

A ſpina ventoſa, ſtrictly ſo called, is by Heiſter divided into three degrees: the firſt is, when the patient complains of a grievous pain in the bone, which ſeems to him to proceed from the medulla. At this time there is no external pain nor tumour. In this ſtate the diſeaſe is confined to the internal part of the bone. The ſecond degree of the diſeaſe is, when after the pains a tumour appears upon the face of the bone, either hard or ſoft, and as it were windy, with external pain more or leſs. The third degree is, when after all the ſymptoms, an abſceſs is formed in the tumour, which either burſts ſpontaneouſly or is opened with the knife, and diſcharges a fetid ichor, or purulent matter, ſmelling like rank butter or lard.

There are two methods of treating this diſorder: one ſuited to the two milder degrees of it, and the other to the more violent ſtate of it. In the milder ſtages, Heiſter directs that the acrimony of the blood be corrected by large draughts of the decoctions of the woods with the china and ſarſaparilla roots: that the parts affected be fumigated with the ſteam of decoctions of aromatic herbs; and twice a day, in the intermediate times, that the part be rubbed over with mercurial ointment, and afterwards covered with the common mercurial plaſter. Mercurial medicines muſt alſo be given internally, according to the ſtrength of the patient; and ſometimes a ſalivation is neceſſary. By diligently purſuing this method for ſome weeks, the firſt and ſecond ſtages of this diſorder may be cured, even where there are bony tumours formed; and the tumours may either be reduced, or at leaſt brought to that ſtate, that they will remain as they are without farther increaſe or without pain, or any farther inconveniency. But when theſe tumours are ſo far advanced as to be out of the reach of remedies, the pains and tumours increaſing, and abſceſſes forming, there is great reaſon to fear the entire deſtruction of the bone. If the abſceſs does not burſt of itſelf, the ſurgeon muſt not wait for its maturation, but lay the bone bare, in the loweſt or moſt painful part. When the abſceſs is already burſt, if the opening is too ſmall it muſt be enlarged, either with the knife or a cauſtic; and after this ſeveral holes muſt be made in the bone with a ſmall piercer, perforating it into the medulla, to give way for the diſcharge of the confined matter; and when theſe ſmall holes are not ſufficient, a larger muſt be made by the trepan, if the bone will admit it.

Whilſt this is under cure, the patient muſt uſe, internally, the decoction of the woods, and mild mercurial and antimonial medicines; and externally, the wound muſt be treated with cleanſing and balſamic remedies, ſuch as decoctions of agrimo-

ny, ſanicle, St. John's-wort, or birth-wort, and eſſence of myrrh and aloes, which muſt be injected with a ſyringe twice every day, as may alſo a ſolution of mercurius dulcis, made in plantane-water or lime-water. Honey of roſes ſhould be added, in a ſmall quantity, to either of the decoctions uſed as eſſences; and after the uſe of them the wound ſhould be dreſſed with the forementioned eſſences, or with thoſe of maſtich, or amber, ſpread upon lint, and covered with a mercurial or other plaſter. This method is to be continued till the parts are healed. The actual cautery is ſometimes neceſſary to root out the diſorder, eſpecially when it is only between the lamellæ of the bone. See CAUTERY. But when all theſe methods are unſucceſs- and the part is already too much corroded and deſtroyed, there is no hope of ſaving it, nor indeed the life of the patient, by any other means than cutting off the limb. When the diſorder is ſituated, however, in ſome ſmall bone, as on the carpus, tarſus, metacarpus, or metatarſus, or fingers, it will not be neceſſary to take off the whole limb, as it will frequently ſuffice to remove the corrupt bone alone. In larger bones, where the whole bone is not affected, but only a part of its external ſurface is diſordered, by either a caries or a ſpina ventoſa, the whole limb is by no means to be taken off, but the diſeaſed part of the bone only removed: but when a large bone, as the os humeri, tibia, or femur, or an intire joint of the arm, knee, or foot, is diſeaſed, there is no remedy but amputating it in the ſound parts juſt above.

SPINACHIA, or SPINACIA, SPINACH, or SPINAGE, in botany, a genus of the *dioecia-pentandria* claſs of plants: the calyx of the male flower is divided into five parts, having no corolla: the calyx of the female flower is divided into four parts, having no corolla neither: the ſtyles are four: the ſeed is ſingle, roundiſh, and incloſed within the cup, which becomes indurated.

This plant is well enough known in food, but has nothing to do in medicine, except in counterfeiting the colours of ſome things of value, as particularly giving to Gaſcoign's powder the ſame colour as is given by bezoar: however, the leaves of ſpinach are, by ſome writers, claſſed among the coolers.

SPINAL MARROW. See the article MEDULLA SPINALIS.

SPINALIS, in anatomy, the names of ſeveral muſcles, *&c.* of the ſpine, but more particularly that of a muſcle on the ſide of the neck, ariſing from the five ſuperior proceſſes of the vertebræ of the thorax, and the inferior of the neck; and which in its aſcent, becoming more fleſhy, is inſerted into the inferior part of the vertebræ of the neck laterally. It ſerves to draw the neck backwards.

Other muſcles of the back, neck, *&c.* called by ſome anatomiſts ſpinalis, are, 1. the ſpinalis cervicis, called by others tranſverſalis: 2. ſpinales colli minores, are muſcles lying between the ſix ſpinal apophyſes of the neck, and between the laſt of the neck and the firſt of the back, called by ſome interſpinales. Other muſcles of this name are, 3. the ſpinalis dorſi, being called by ſome, a part of the ſemi-ſpinatus; and by others, a part of the longiſſimus dorſi. 4. The ſpinalis dorſi major, is a pretty, long and ſlender muſcle, lying upon the lateral parts of the extremities of the ſpinal apophyſes of the back, called, by ſome, ſemi-ſpinalis. 5. Spinales dorſi minores are muſcles of two kinds, ſome going laterally from the extremity of one ſpinal apophyſes to another, being often mixed with the ſhort faſciculi of the ſpinalis major; the reſt lie directly between the extremities of two neighbouring ſpinal apophyſes; being ſeparated from thoſe on the other ſide by the ſpinal ligament: theſe are ſometimes termed interſpinales. 6. Spinales, and tranſverſales lumborum, are ſome faſciculi which run up from the ſuperior falſe ſpines of the os ſacrum, to the lower ſpinal apophyſes of the loins. See the articles MUSCLE, TRANSVERSALIS, *&c.*

For the ſpinal nerves, *&c.* ſee the article NERVE, *&c.*

The ſpinal acceſſory nerve of Willis, is a ſort of ninth pair of nerves of the neck, ariſing from the ſpinal marrow, about the origin of the third or fourth pair, and paſſing through the great foramen of the os occipitis up into the cranium: it is then joined to the par vagum, and coming out of the cranium again by the ſame aperture, it recedes from the par vagum, and is bent back to the muſculus ſcapulæ cucullaris or trapezius.

SPINDLE,

SPINDLE, in the ſea-language, is the ſmalleſt part of a ſhip's capſtan, which is betwixt the two decks. The ſpindle of the jeer-capſtan has whelps to heave the viol. See CAPSTAN.

The axis of the wheel of a watch or clock, is alſo called the ſpindle. Among miners, the ſpindle is a piece of wood faſtened into either ſtow-blade.

SPINDLE-SHELL, in ichthyology, the ſlender tuberculous buccinum, with an elongated roſtrum. See BUCCINUM.

SPINE, SPINA-DORSI, in anatomy, the bony column reaching from the head down to the anus; being the ſeries or aſſemblage of vertebræ which ſuſtain the reſt of the body, contain the ſpinal marrow, and to which the ribs are connected. See the articles VERTEBRÆ, MEDULLA SPINALIS, and RIBS.

The uſual diviſion of the ſpine is into the neck, the back, the loins, and the os ſacrum, and coccygis. See the articles NECK, DORSUM, *&c.*

Luxations, fractures, and other injuries of the SPINE. The ſigns common to luxations in the ſpine are cheifly the following: The back itſelf is found to be crooked after ſome external violence has been inflicted upon it; the patient can neither ſtand nor walk, and his whole body ſeems to be paralytic; the parts which are beneath the luxated vertebræ are nearly without all ſenſe and motion; the excrements and urine cannot be diſcharged, or elſe they are ſometimes emitted involuntarily; the lower extremities grow dead by degrees, and at length death itſelf follows: but theſe ſymptoms vary in proportion to the degree of violence in the luxation. Where there is but one vertebra luxated, the cuvature is gibbous, making a ſort of angle: if the proceſſes of the vertebræ are diſplaced forwards, then the ſpine will ſeem to bend inwards, and the pains will be more gentle, when the patient lies on his back: if the vertebra is luxated on the right ſide, the body will incline towards the left, and *vice verſa*. Luxations of the ſpinal vertebræ are in general very difficult to reduce; but the following ſeems to be the beſt method of reducing them, according to Heiſter: When the apophyſes are diſlocated on both ſides, the patient is to be laid leaning upon his belly over a caſk, drum, or ſome other gibbous body, and then two aſſiſtants are ſtrongly to preſs down both ends of the ſpine on each ſide; then the ſurgeon is to preſs down the luxated vertebræ, and at the ſame time to puſh nimbly the ſuperior part of the body upwards, by which means the luxated vertebra are ſometimes commodiouſly reduced into their right places: but if ſucceſs ſhould not attend the firſt time, the method ſhould be repeated two or three times more. When the vertebra comes out on one ſide, the patient is then to be placed as before, but ſo that when the left apophyſis is diſplaced, one aſſiſtant may preſs the lower vertebræ inwards to the right, and another aſſiſtant may depreſs the right humerus, and *vice verſa*. For the remainder, it ſeems proper, after the vertebræ are reduced, to bathe the ſpine with ſpirit of wine, or to lay on compreſſes dipped in ſpirit of wine camphorated, and to bind the parts up with the napkin and ſcapulary. See the article LUXATION.

When any of the vertebræ are fractured either by a fall, blow, or any other cauſe, without hurting the ſpinal marrow, it is to be ſuppoſed that the fracture is confined to ſome of the oblique or ſpinal proceſſes, and therefore the patient will be in no great danger; but when the body of the vertebræ is either broke or ſplit, and the contiguous ſpinal marrow bruiſed or compreſſed, all the parts of the limbs and viſcera beneath that vertebra will become immoveable and rigid, and death will ſooner or later follow the accident: and if the tranſverſe proceſſes of the vertebræ are broke, which incline towards the cavity of the thorax, it is ſcarce poſſible that the heads of the ribs, which are there connected, ſhould eſcape being fractured. Theſe fractures are to be judged of from the nature of the external violence which occaſioned them, from the pains ſeated about the affected vertebra, and from the touch, eye, *&c.* When only the proceſſes of the vertebræ are found broken, it will be much the beſt way to force them into their places with the fingers, placing narrow compreſſes dipt in warm ſpirit of wine on each ſide of the vertebræ, and over them ſlips of thick paſteboard, to be kept on by the napkin and ſcapulary. See the article FRACTURE.

When the ſpine is ſo injured that the ſpinal marrow is wounded, ſuch wounds as are ſlight may be dreſſed with peruvian balſam, eſſence of myrrh, or medicines of a like nature, mixed with a quantity of honey of roſes ſpread upon

a pledget, and applied moderately warm; by which means, if the patient is of a good conſtitution, the parts ſometimes heal, but large wounds here bring certain death.

For the luxations, fractures, &c. of the other parts of the ſpine, ſee the articles NECK, LOINS, OS SACRUM, &c.

SPINET, or SPINNET, a muſical inſtrument ranked in the ſecond or third place among harmonious inſtruments. It conſiſts of a cheſt or belly made of the moſt porous and reſinous wood to be found, and a table of fir glued on ſlips of wood called ſummers, which bear on the ſides. On the table is raiſed two little prominences or bridges, wherein are placed ſo many pins as there are chords or ſtrings to the inſtrument. It is played on by two ranges of continued keys, the former range being the order of the diatonic ſcale, and that behind the order of the artificial notes or ſemi-tones. The keys are ſo many flat pieces of wood, which, touched and preſſed down at the end, make the other raiſe a jack which ſtrike and ſound the ſtrings by means of the end of a crow's quill wherewith it is armed. The thirty firſt ſtrings are of braſs, the other more delicate ones of ſteel or iron-wire; they are all ſtretched over the two bridges already mentioned. The figure of the ſpinet is a long ſquare or parallelogram; ſome call it an harp-couched, and the harp an inverted ſpinet. See the article HARP.

This inſtrument is generally tuned by the ear, which method of the practical muſicians is founded on a ſuppoſition, that the ear is a perfect judge of an octave and fifth. The general rule is to begin at a certain note, as C, taken towards the middle of the inſtrument, and tuning all the octaves up and down, and alſo the fifths, reckoning ſeven ſemi-tones to each fifth, by which means the whole is tuned. Sometimes to the common or fundamental play of the ſpinet is added another ſimilar one in uniſon, and a third in octave to the firſt, to make the harmony the fuller; they are either played ſeparately or together by means of a ſtop; theſe are called double or triple ſpinets; ſometimes a play of violins is added, by means of a bow, or a few wheels parallel to the keys, which preſs the ſtrings and make the ſounds laſt as long as the muſician pleaſes, and heighten and ſoften them more or leſs, as they are more or leſs preſſed. The harpſicord is a kind of ſpinet, only with another diſpoſition of the keys. See the article HARPSICORD.

SPINNING, in commerce, the act or art of reducing ſilk, flax, hemp, wool, hair, or other matters, into thread. Spinning is either performed on the wheel with a diſtaff and ſpindle, or with other machines proper for the ſeveral kinds of working. Hemp, flax, nettle-thread, and the like vegetable matters, are to be wetted in ſpinning; ſilks, wools, &c. are to be ſpun dry, and do not need water; but there is a way of ſpinning ſilk as it comes off the caſes or balls, where hot and even boiling water is to be uſed. See the articles SILK, THREAD, &c.

SPINOSE LEAF, in botany, expreſſes a leaf whoſe diſk or edge is armed with cartilaginous points, ſo firmly affixed that they cannot be ſeparated without injuring the leaf itſelf.

SPINOUS FISHES, ſuch as have ſome of the rays of the back-fins running out into thorns or prickles, as the pearch, &c. See the article ICHTHYOLOGY.

SPINOZISM, or SPINOSISM, the doctrine of Spinoza, or atheiſm and pantheiſm propoſed after the manner of Spinoza, who was born a Jew at Amſterdam.

The great principle of ſpinoziſm, is that there is nothing properly and abſolutely exiſting beſides matter and the modifications of matter; among which are even comprehended thought, abſtract and general ideas, compariſons, relations, combinations of relations, &c.

The chief articles in Spinoza's ſyſtem are reducible to theſe. That there is but one ſubſtance in nature, and that this only ſubſtance is endued with an infinite number of attributes, among which are extenſion and cogitation: that all the bodies in the univerſe are modifications of this ſubſtance conſidered as it is extended; and that all the ſouls of men are modifications of the ſame ſubſtance conſidered as cogitative: that God is a neceſſary and infinitely perfect being, and is the cauſe of all things that exiſt, but not a different being from them: that there is but one being and one nature, and that this nature produces within itſelf, by an immanent act, all thoſe which we call creatures; and that this being is at the ſame time both agent and patient, efficient cauſe and ſubject, but that he produces nothing but modifications of himſelf.

Thus

Thus is the deity made the ſole agent as well as patient in all evil, both phyſical and moral; a doctrine fraught with more impieties than all the heathen poets have publiſhed concerning their Jupiter, Venus, Bacchus, &c. It is obſerved, that what ſeems to have led Spinoza to this ſyſtem, was the difficulty of conceiving either that matter is eternal and different from God, or that it could be produced from nothing, or that an infinite and free being could have made a world ſuch as this is. A matter that exiſts neceſſarily, and which nevertheleſs is void of activity, and ſubject to the power of another principle, is an object that ſtartles our underſtanding, as there ſeems no agreement between the three conditions. It is alſo held, that a matter created out of nothing, ſeems to be no leſs inconceivable, whatever efforts we make to form an idea of the act of the will that can change what before was thought nothing into real ſubſtance. Beſides, its being contrary to that known maxim of philoſophers, *ex nihilo nihil fit*. In fine, that an infinitely good, holy, free being ſhould rather chooſe to have them wicked and eternally miſerable, is no leſs incomprehenſible; and the rather as it ſeems difficult to reconcile the freedom of man with the quality of a being made out of nothing. Theſe, it is obſerved, appear to have been the difficulties which led Spinoza to ſearch for a new ſyſtem, wherein God ſhould not be diſtinct from matter, and wherein he ſhould act neceſſarily, and to the extent of all his power, not out of himſelf (*ad extra*) but within himſelf. But it is certain, that if this ſyſtem reſcues us from ſome difficulties, it involves us in others much greater. See the articles GOD, SOUL, NATURE, MATTER, EXISTENCE, SUBSTANCE, EXTENSION, GENERATION, CORRUPTION, ESSENCE, &c.

SPINSTER, in law, an addition uſually given to all unmarried women from the viſcount's daughter downwards; but, according to Sir Edward Cooke, generoſa is a good addition for a gentlewoman; and that if ſuch a perſon be named ſpinſter in any original writ, appeal, or indictment, ſhe may abate and quaſh the ſame.

SPIRÆA, in botany, a genus of the *icoſandria-pentagynia* claſs of plants, with a roſaceous flower, conſiſting of five roundiſh, plane petals: its fruit conſiſts of five oblong, compreſſed, acuminated capſules, each formed of two valves, and containing a few acuminated and ſmall ſeeds.

This genus comprehends the white ſhrubby hypericum of authors.

SPIRÆA is alſo a name given to the dioſma of Linnæus. See the article DIOSMA.

SPIRAL, in geometry, a curve line of the circular kind, which, in its progreſs, recedes from its center.

A ſpiral, according to Archimedes, its inventor, is thus generated: if a right line, as AB (plate CCLIX. fig. 2.) having one end fixed at B, be equally moved round, ſo as with the other end A to deſcribe the periphery of a circle; and, at the ſame time, a point be conceived to move forward equally from B towards A, in the right line BA, ſo as that the point deſcribes that line, while the line generates the circle: then will the point, with its two motions, deſcribe the curve-line B 1, 2, 3, 4, 5, &c. which is called the helix or ſpiral line; and the plane ſpace, contained between the ſpiral line and the right line BA, is called the ſpiral ſpace.

If alſo you conceive the point B to move twice as ſlow as the line AB, ſo as that it ſhall get but half way along the line BA, when that line ſhall have formed the circle; and if then you imagine a new revolution to be made of the line carrying the point, ſo that they ſhall end their motion at laſt together, there will be formed a double ſpiral line, and the two ſpiral ſpaces, as you ſee in the figure. From the geneſis of this curve, the following corollaries may be eaſily drawn. 1. The lines B 12, B 11, B 10, &c. making equal angles with the firſt and ſecond ſpiral (as alſo B 12, B 10, B 8, &c.) are in arithmetical proportion. 2. The lines B 7, B 10, &c. drawn any how to the firſt ſpiral, are to one another as the arches of the circle intercepted betwixt BA and thoſe lines. 3. Any lines drawn from B to the ſecond ſpiral, as B 18, B 22, &c. are to each other as the aforeſaid arches, together with the whole periphery added on both ſides. 4. The firſt ſpiral ſpace is to the firſt circle as 1 to 3. And, 5. The firſt ſpiral line is equal to half the periphery of the firſt circle; for the radii of the ſectors, and conſequently the arches, are in a ſimple arithmetic progreſſion, while the periphery of the circle contains as many arches

arches equal to the greateſt; wherefore the periphery to all thoſe arches is to the ſpiral lines as 2 to 1.

SPIRAL, in architecture and ſculpture, implies a curve that aſcends, winding about a cone or ſpire, ſo as all the points thereof continually approach the axis. It is diſtinguiſhed from the helix, by its winding around a cone, whereas the helix winds in the ſame manner around a cylinder.

Proportional SPIRALS, are ſuch ſpiral lines as the rumb lines on the terreſtrial globe, which, becauſe they make equal angles with every meridian, muſt alſo make equal angles with the meridians in the ſtereographic projection on the plane of the equator; and therefore will be, as Dr. Halley obſerves, proportional ſpirals about the polar point. See RHUMB.

SPIRAL-STAIRS. See STAIRS.

SPIRATION, or rather RESPIRATION. See the article RESPIRATION.

SPIRE, *ſpira*, in architecture, was uſed by the antients for the baſe of a column, and ſometimes for the aſtragal or tore. But, among the moderns, it denotes a ſteeple that continually diminiſhes as it aſcends, whether conically or pyramidally. See the article STEEPLE.

SPIRE, in geography, an imperial city of Germany, capital of a biſhopric of the ſame name, and ſituated in the palatinate of the Rhine, fifteen miles ſouth-weſt of Heidelburg: eaſt long. 8° 17′, north lat. 49° 16′.

SPIREBACH, a town of Germany, ſituated on a river of the ſame name, eight miles north of Landau.

SPIRIT, *ſpiritus*, in metaphyſics, an incorporeal being or intelligence; in which ſenſe, God is ſaid to be a ſpirit, as are angels and the human ſoul. See the articles GOD, ANGEL, and SOUL.

The word ſpirit is, indeed, uſed in general to denote all thinking intelligent ſubſtances; but it would be the height of folly to imagine, becauſe this name is applied to the Creator as well as to the human ſoul, that therefore they partake of one common nature, and differ only as different modifications of the ſame ſubſtance: wherefore, when we call God a ſpirit, we ought by no means raſhly to preſume, that he is ſo in the ſame ſenſe in which the human ſoul is a ſpirit.

However, though we readily own there may be various ranks of ſpiritual beings; yet as we have no conceptions of the powers and operations of intellectual natures diſtinct from thoſe of our own minds, we are neceſſitated to conceive of them in a manner ſuited to our knowledge; and when we would rank them into ſpecies, according to the degrees of of ſuperiority they are imagined in the ſcale of being, we aſcribe to them what we find moſt excellent in ourſelves, as knowledge, thinking, foreſight, &c. and thoſe in different meaſures, proportioned to the ſtation peculiar to each rank. But that this is a very imperfect way of diſtinguiſhing the various orders of intellectual beings, needs not many words to make appear; eſpecially if we conſider, that the manner of communicating their thoughts without the intervention of bodily organs, is a thing to us altogether incomprehenſible; which neceſſarily leads us to ſuppoſe, that they have ways of perception and knowledge, whereof our faculties cannot give us any notice. See the articles ESSENCE, EXISTENCE, and SUBSTANCE.

SPIRITS, or ANIMAL SPIRITS, in phyſiology. See ANIMAL SPIRITS.

Our perceptions and actions are ſuppoſed to depend on the facility with which theſe ſpirits paſs from the brain to the nerves, and back from the nerves to the brain: for if the brain, the cerebellum, or the ſpinal marrow is hurt, there happens in all the parts where the nerves are diſtributed, which proceed from the diſordered part, convulſions and palſies; and if any nerve is tied or cut, the parts below the ligature loſe their ſenſe and motion, while thoſe above continue in their former ſtate. See the articles BRAIN, CEREBELLUM, MARROW, and NERVE.

SPIRIT, in chemiſtry, a name applied to ſeveral very different ſubſtances; however, in general, it denotes any diſtilled volatile liquor that is not inſipid, as phlegm, or pure water, nor inflammable as oil: but under this general idea are comprehended liquors of quite oppoſite natures, ſome being acid, and others alkaline; which laſt are ſuch enemies to the former, that as ſoon as they are put together they raiſe a violent efferveſcence, and grow hot: and to theſe may be added a third ſort, called vinous or inflammable ſpirits; which though very ſubtile and penetrating, are not manifeſtly either acid or alkaline.

All theſe ſorts of ſpirits Mr. Boyle ſhews to be producible: and, 1. The vinous, which nature ſcarce ever produces of herſelf,

herſelf, are the creatures of vinous fermentation, or are actually produced, though not ſeparated, in that operation. See FERMENTATION, BRANDY, RUM, RACK, &c.

2. The alkaline or volatile ſpirits, called alſo the urinous, by reaſon of their affinity in many qualities with ſpirit of urine, are manifeſtly not ſimple but compound bodies; conſiſting of the volatile ſalt of the reſpective concretes diſſolved in the phlegm, and for the moſt part accompanied with a little oil: ſo that theſe may be referred to the claſs of volatile ſalts. See the article SALT.

3. Acid ſpirits appear to be producible, becauſe thoſe drawn from common ſalt and nitre are very different in reſpect of taſte, &c. from the bodies they are procured from, which are not properly acid: ſo that it does not appear that theſe ſpirits pre-exiſted in that ſtate of thoſe bodies.

What farther confirms this doctrine of ſpirits is, that the ſame body, merely by different ways of ordering it, may be brought to afford either acid, vinous, or urinous ſpirits; add, that whereas ſalt is accounted the principle of all taſte, it follows that ſpirits, being ſapid, muſt contain ſalt; ſince it is taſte that characterizes and diſtinguiſhes it from phlegm, and denominates it acid, vinous, or urinous ſpirit.

Spirits, diſtilled from fermented liquors, conſiſt of very different ingredients, *viz.* a pure ſpirit or alcohol, phlegm, a certain acetous fermented acid, and a ſmall quantity of ill-ſcented oil; ſo that it becomes neceſſary, in order to obtain the ſpirit perfectly pure, to re-diſtil it ſeveral times, as directed under the articles DISTILLATION and RECTIFICATION. By reducing ſpirit, therefore, to the utmoſt degree of purity, an alcohol is obtained; which, as Dr. Shaw expreſſes it, is a liquor ſui generis, and poſſeſſed of many peculiar qualities; as, 1. When abſolutely purified, it is an uniform and homogeneous liquor, capable of no farther ſeparation, without loſs or deſtruction of ſome of its homogeneous parts. 2. It is totally inflammable, leaving no ſoot, nor any moiſture behind. 3. It has no peculiar taſte or flavour, any more than pure water, except what is owing to its nature as alcohol, or perfectly pure ſpirit. 4. It is an unctuous and criſpy fluid, running veiny in the diſtillation, and its drops rolling on the ſurface of any other fluid, like peaſe upon a table, before they unite. 5. It appears to be the eſſential oil of the body it is obtained from, broken very fine, and intimately and ſtrongly mixed with an aqueous fluid, which is aſſimilated, or changed in its nature in the operation. 6. And laſtly, it ſeems to be a kind of univerſal fluid, producible with the ſame properties from every vegetable ſubject; but to produce it thus, requires ſome care in the operation. See ALCOHOL.

On theſe principles is founded the opinion, that all ſpirits may be reduced to a perfect ſimilarity, or ſameneſs, from whatever ſubject they are produced, and on this depends their convertibility into one another; for when once they are brought to this ſtandard of ſimplicity, there needs nothing more than to add the oil of ſuch of the finer ſpirits as is required to convert the ſpirit into that particular kind. By this means the ſame taſteleſs ſpirit, whether obtained from malt, ſugar, or grapes, may be made into either malt ſpirit, brandy, or rum, by adding the eſſential oil of the grape, ſugar, or malt; and thus what was once malt ſpirit, ſhall become brandy, or whatever elſe the operator pleaſes.

Many methods have been attempted to obtain the firſt point, that is, the reducing the ſpirit to perfect and pure alcohol: the moſt practicable means ſeem to be long digeſtion, and the repeated diſtillation from water into water, where the eſſential oil will at once be left upon two ſurfaces, and the acid imbibed: the ſhorter ways, are thoſe by rectifying from neutral abſorbent ſalts and earths; ſuch are ſugar, chalk and the like; and, laſtly, the uſe of fixed alkalies may be tried, for theſe very forcibly keep down both the phlegm and oil; inſomuch that this laſt method promiſes to be the ſhorteſt of all, if the art were known of utterly aboliſhing the alkaline flavour, which the alcohol is apt to acquire.

For as vinous ſpirits ariſe with a leſs degree of heat than watery liquors, if due regard be had to this circumſtance, very weak ſpirits may, by one or two wary diſtillations, in a degree of heat leſs than that in which water boils, be tolerably well freed of their aqueous phlegm: and in order to free it from its foul oil, add to every gallon of it a pound or two of pure, dry, and fixed alkaline ſalt; which being digeſted together for ſome time, the alkali, from its known property of

attracting water and oils, will imbibe the remaining phlegm, and ſuch part of the diſagreeable unctuous matter as may be ſtill left in the ſpirit, and ſink with them to the bottom of the veſſel. If the ſpirit be now again gently drawn over, it will ariſe entirely free from its phlegm and nauſeous flavour; but as ſome particles of the alkaline ſalt are apt to be carried up with it, and give it an urinous reliſh, a ſmall proportion of any fixed acid liquor, or rather of an acid ſalt, as vitriol or alum, ſhould be added to it.

The ſpirit obtained by this proceſs is called alcohol, and is extremely pure, limpid, perfectly flavourleſs, and fit for the fineſt purpoſes: it may be reduced to the ſtrength commonly underſtood by proof-ſpirit, by mixing twenty ounces of it (by weight) with ſeventeen ounces of water. The diſtilled cordials made with theſe ſpirits, are much more elegant and agreeable than when the common rectified or proof ſpirits of the ſhops are made uſe of.

There are many occaſions in which chemiſts, and other artificers, ſtand in need of the true and pureſt alcohol, the leaſt remainder of water rendering the operation unſucceſsful: hence it is abſolutely neceſſary we ſhould have ſome marks, by which to diſtinguiſh whether our alcohol be pure or not. The principal of theſe are, 1. If the ſuppoſed alcohol contains any oil diſſolved in it, and ſo equably diſtributed through it, that it is no ways perceptible, then upon pouring of water into it, the mixture will grow white, and the oil ſeparate from the alcohol. 2. If any thing of an acid lies concealed in the alcohol, a little of it mixed with the alcaline ſpirit of ſal ammoniac will diſcover the acid by an effervеſcence excited by the affuſion of the acid; for otherwiſe there would be only a ſimple coagulation. 3. If there be any thing of an alkali intermixed, it will appear by the effervеſcence excited by the affuſion of an acid. 4. But it is a matter of great difficulty to diſcover whether there be any water intermixed with it. The beſt method of doing this is the following: take a chemical veſſel with a long narrow neck, the bulb of which will hold four or ſix ounces of alcohol. Fill this two thirds full with the alcohol you intend to examine, into which throw a dram of the pureſt and drieſt ſalt of tartar, coming very hot out of the fire; then mix them by ſhaking them together, and ſet them over the fire till the alcohol is juſt ready to boil. Being thus ſhaken, and heated, if the ſalt of tartar remains perfectly dry, without the leaſt ſign of moiſture, we are ſure that there is no water in the alcohol. The learned Boerhaave tells us, that by this method he diſcovered water in alcohol which had been looked upon as pure, having undergone every other method of trial.

Medicinal virtues of SPIRITS. The too free uſe of inflammable or vinous ſpirits, is attended with very bad effects; as the body is thereby greatly attenuated, the ſtrength impaired, and the brain ſtupified. However, as Dr. Pringle juſtly obſerves, we ought not to confound the neceſſary and moderate uſe of ſpirits, with the vice of indulging in them to exceſs. So far, therefore, from thinking the moderate uſe of ſpirits detrimental to ſoldiers, and others, who are expoſed to the extremes of heat and cold, and to moiſt and bad air, that he even recommends it; and as to ſoldiers in particular, he obſerves, that ſpirits, even when drank to exceſs, tend more to weaken the conſtitution than to produce any of the common camp-diſeaſes. Hence, in eſtabliſhing meſſes among the ſoldiers, which he thinks would be attended with many good conſequences, he alſo recommends ſome regulations to be made with regard to an allowance of ſpirits, whether by ſtoppages on the pay or otherwiſe: this he enforces by obſerving, that the like practice already obtains in the navy, and probably for the ſame reaſons for which it would be proper in the army; ſince, in ſhips, the men are alſo liable to diſtempers ariſing from moiſt and corrupted air. It is the abuſe, therefore, of vinous ſpirits that ought to be condemned; ſince, taken in moderation, they can do no harm; and if properly accommodated to circumſtance, may have very good effects.

Spirits are alſo of uſe, in external applications, to wounds and ſores; as they ſtimulate the fluids, reſiſt putrefaction, and quicken the pulſe when abſorbed. Tinctures of abſorbent and aromatic powders are often preſcribed with the ſame intention; by reaſon they partake of the nature of their ingredients, but principally of the ſpirit.

As to the volatile ſpirits, diſtilled from animal and other ſubſtances, they are in general extremely pungent and acrimo-

nious;

nious; applied to the ſkin, and prevented from exhaling, they inflame the part, and produce the effect of cauſtics; they alſo liquify the animal-juices, and diſſolve the coagula made from them with acids; with which being mixed, they effervesce, and unite into a neutral ſalt. With regard to their medical virtues, they ſtimulate the nervous ſyſtem, attenuate viſcid humours, promote a diaphoreſis, and other natural ſecretions, and abſorb acidities in the primæ viæ: they are particularly uſeful in the lethargic and apoplectic caſes, in hypochondriacal and hyſterical diſorders, and the languors, head-achs, inflations of the ſtomach, flatulent colics, and other ſymptoms which attend them. However, they are generally found more ſerviceable to aged perſons, and in phlegmatic habits, than in the oppoſite circumſtances: in febrile and inflammatory diſtempers, they are hurtful, except in ſuch fevers as are accompanied with a cough, hoarſeneſs, and redundance of phlegm: they are moſt conveniently exhibited in a liquid form, largely diluted with water, or other convenient liquors; the doſe being from five or ſix to thirty or more drops.

The acid ſpirits drawn from foſſils, and applied to animal bodies, coagulate the fluids, and mortify the ſolids: by being diluted with water, they approach to the nature of vinegar. Metallic ſubſtances, diſſolved in theſe ſpirits, increaſe their corroding ſphacelating quality, ſo as ſometimes to occaſion convulſions.

As for the ſpirituous diſtilled waters, which make no ſmall part of the ſhop-medicines. See *Diſtilled* WATERS.

SPIRITUAL, in general, ſomething belonging to, or partaking of, the nature of ſpirit. See SPIRIT.

The ſpiritual courts, in law, are ſuch as have juriſdiction in matrimonial cauſes, and for probate of wills, and granting adminiſtration of goods; as alſo in regard to tythes, and in caſes of defamation, *&c.* See the articles COURT, WILL, ADMINISTRATOR, *&c.*

SPIRITUALITIES *of a biſhop*, are the profits that he receives as a biſhop, and not as a baron of parliament; ſuch are the duties of his viſitation, preſentation-money, what ariſes from the ordination and inſtitution of prieſts, the income of his juriſdiction, *&c.* See BISHOP.

SPITAL, a town of Carinthia, in Germany: eaſt long. 13° 28′, north lat. 47°.

SPITHEAD, a road between Portſmouth and the Iſle of Wight, where the royal navy of Great Britain frequently rendezvous.

SPIT-INSECT, in zoology, the cicada with brown wings, and two white ſpots on them, and a double white line. See the article CICADA.

SPITTLE, *ſaliva*, in phyſiology. See the article SALIVA.

SPITZBERGEN, or GROENLAND. See the article GROENLAND.

SPLAIT, or SHOULDER-SPLAIT, among farriers. See SHOULDER.

SPLEEN, *σπλην, lien*, in anatomy, is a viſcus of a deep blackiſh-red colour, ſituated on the left ſide of the ſtomach, under the diaphragm, near the ribs, and above the left kidney. Its figure is ſomewhat uncertain; but is uſually like that of a tongue, being hollow towards the ſtomach, and convex towards the diaphragm and ribs: however, it is often irregular, and has in many parts fiſſures. It is connected with the ſtomach, by the vaſa brevia, and with the pancreas, omentum, the diaphragm, and left kidney by membranes. Its ſize is various, but is uſually five or ſix inches long, three broad, and one inch thick, in the human body: in dogs, hogs, and many other animals, it is much larger and thinner.

In human ſubjects, the ſpleen has but one membrane; but in calves, and ſome other animals, it has two: in this caſe, the external one is robuſt, common, and adheres but laxly, by means of the ſanguiferous veſſels to the inner one, which is proper and very thin, and, when the outer one is taken off, tranſmits the breath.

The veſſels of the ſpleen, conſidering its ſize, are remarkably large: its artery is from the cœliac, and is called the ſplenic artery; and in human ſubjects really tranſmits water, air, or mercury, thrown into it, into the veins: the ſplenic vein is, like thoſe of the other viſcera, very much ramified, and its branches are carried throughout the whole ſpleen; but, in calves, *&c.* it is ſoon after its ingreſs into the ſpleen, transformed into cells: in calves alſo, both veſſels enter at one extremity; but in the human body, they are divided into various branches, and run over the whole concave or internal ſurface: the nerves of the ſpleen are from the plexus ſplenicus: the ſpleen has no excretory duct; but there are in it

lymphatic veſſels, running to the receptacle.

The ſubſtance of the ſpleen has been ſaid to be celluloſe and glanduloſe: in calves, indeed, it is celluloſe; but in man, it is vaſculoſe and fibroſe. What authors have deſcribed as glands in the ſpleen, Ruyſch has proved to be only veſſels; all the glands about the ſpleen being only one or two lymphatic ones, of about the bigneſs of a bean, ſituated without it near where the veſſels enter.

The uſe of the ſpleen has been much controverted by authors; but the moſt probable opinion ſeems to be, that it ſerves to render the blood more fluid, out of which the bile is to be afterwards ſecreted; and that by this means obſtructions, which muſt otherwiſe be frequent, are prevented, and the ſecretion of the bile promoted.

Infarction of the SPLEEN. In this caſe, the ſpleen ſwells, together with the left adjacent region; and ſometimes there is a tenſeneſs of the belly: this diſeaſe is increaſed by reſt, and too rich a diet; and therefore exerciſe, and a ſpare diet are proper; as are acids, as vinegar, or thin and auſtere wine; and, in general, all meats and drinks, which have the virtue of promoting urine, as the ſeeds of treſoil, cummin, parſley, wild thyme, hyſſop, and ſavory; and the herbs rocket, ſpleenwort, and creſſes. See the article HYPOCHONDRIAC PASSION.

SPLEEN-WORT, *lonchitis*. See the article LONCHITIS.

SPLENETIC, a perſon affected with obſtruction of the ſpleen. See the articles SPLEEN and HYPOCHONDRIAC PASSION.

SPLENIC VESSELS, the artery and vein of the ſpleen. See SPLEEN.

SPLENIUS, in anatomy, a pair of the extenſor muſcles of the head, which riſing from the lower vertebra of the neck, and the five upper ones of the back, is inſerted a little above the maſtoide proceſs. See the article MUSCLE.

SPLENT, or SPLINT, among farriers, a callous, inſenſible excreſcence, breeding on the ſhank-bone of horſes; which, when it grows big, ſpoils the ſhape of the leg, and generally comes upon the inſide: but if there be one oppoſite to it on the outſide, it is called a peg, or pinned ſplent; becauſe it does, as it were, pierce the bone, and is extremely dangerous.

The ſimple ſplents are only faſtened to the bone, at a pretty diſtance from the knee, and without touching the back ſinew, and have not a very bad conſequence; but thoſe that touch the back ſinew, or are ſpread on the knee, will make a horſe lame in a ſhort time.

For the cure of this malady, ſhave away the hair, and rub and beat the ſwelling with the handle of a ſhoeing hammer; then having burnt three or four hazle-ſticks, while the ſap is in them, chafe the ſplent with the juice, or water that iſſues out at both ends, applying it as hot as you can, without ſcalding the part: after that, rub or bruiſe the ſwelling with one of the ſticks, and continue frequently to throw the hot juice upon the part, but ſo as not to ſcald it, and continue ſtill rubbing it, till it grows ſoft. Then dip a linnen-cloth, five or ſix times double, in the hazle-juice, as hot as your hands can endure it, and tie it upon the ſplent, where let it remain for twenty-four hours, keeping the horſe in the ſtable for the ſpace of nine days, not ſuffering him to be either ridden or led to water; by which time, the ſplent will be diſſolved, and the hair will afterwards grow on it again.

SPLENTS, or SPLINTS, in ſurgery, pieces of wood, uſed in binding up broken limbs. See the article FRACTURE.

SPLICING, in the ſea-language, is the untwiſting the ends of two cables or ropes, and working the ſeveral ſtrands into one another by a fidd, ſo that they become as ſtrong as if they were but one rope. See CABLE, *&c.*

SPLINTER, a ſmall ſhiver of wood, or the like. The ſplinters of fractured bones, if looſe, are to be carefully removed, otherwiſe replaced. See the article FRACTURE.

SPODIUM, in pharmacy, one of the fouleſt recrements of copper; being nothing but the worſt and heavieſt parts of the cadmia oſtracitis, thrown up in ſuch coarſe pieces by the blaſt of the bellows, that it does not adhere to the roof or ſides of the furnace, but falls down again into ſeveral parts of the furnace; and being collected along with many other kinds of foulneſſes, in form of a blackiſh heavy matter, is indeed no better than the ſweepings of the furnaces, where the copper is refined. See CADMIA.

SPOILS, *ſpolia*, whatever is taken from the enemy, in time of war.

Among

Among the antient Greeks, the ſpoils were divided in common among the whole army, only the general's ſhare was largeſt; but among the Romans, the ſpoils belonged to the republic.

SPOLETTO, the capital of Umbria, in Italy; it is ſituated fifty miles north-eaſt of Rome.

SPONDEE, *ſpondæus*, in antient poetry, a foot conſiſting of two long ſyllables, as *omnes*. See the article FOOT.

Some give the appellation ſpondaic to verſes compoſed wholly of ſpondees, or at leaſt that end with two ſpondees; as, *Conſtitit, atque oculis Phrygia agmina circumſpexit.*

SPONDIAS, HOG-PLUM, in botany, a genus of the *enneandria-trigynia* claſs of plants, the flower of which conſiſts of five ovated, plane, and patent petals; and its fruit is an oval berry, containing four nuts in each cell. It is called monbin by Plumier.

SPONDYLUS, in anatomy, a name antiently given to a vertebra of the ſpina dorſi. See the article VERTEBRÆ.

SPONGIA, SPUNGE, in botany, *&c.* See the article SPUNGE.

SPONGIOSE, in anatomy, an appellation given to ſeveral parts of the body, on account of their porous and cavernous texture, not unlike that of ſpunge; as the ſpongioſe or ethmoide bone of the noſe, the ſpongioſe bodies of the penis. See NOSE and PENIS.

SPONSORS, among chriſtians, are thoſe perſons, who, in the office of baptiſm, anſwer, or are ſureties, for the perſons baptized. See BAPTISM.

In the antient church, there were three ſorts of ſponſors, 1. For children, who could not anſwer for themſelves; and in moſt caſes, parents were ſponſors for their own children. 2. For ſuch perſons as, by reaſon of ſickneſs or infirmity were in the ſame condition with children; who might be baptized, if their friends teſtified, that they had before-hand deſired baptiſm, and at the ſame time became their ſponſors. 3. For all adult perſons in general; for theſe too had their ſponſors, as no perſons were baptized without them.

It is obſervable, that antiently no more than one ſponſor was required, namely, a man for a man, and a woman for a woman: however, in the caſe of infants, no regard was had to the difference of ſex; for a virgin might be ſponſor for a male child; and a father for his children, whether male or female.

In the modern chriſtian church, the office of ſponſors, or ſureties in baptiſm, is better known than practiſed; we call them god-fathers and god-mothers. See the article GOD-FATHERS.

SPONTANEOUS, a term applied to ſuch motions of the body, and operations of the mind, as we perform of ourſelves, without any conſtraint. See FREEDOM.

SPONTANEOUS, or EQUIVOCAL GENERATION. See EQUIVOCAL.

SPOON BILL, *platea*, in ornithology. See the article PLATEA.

SPOONING, in the ſea-language, is ſaid of a ſhip, which, being under ſail in a ſtorm at ſea, is unable to bear it, and conſequently forced to put right before the wind.

SPORADES, among antient aſtronomers, a name given to ſuch ſtars, as were not included in any conſtellation. See the articles CONSTELLATION and STAR.

SPORADIC DISEASES, among phyſicians, are ſuch as ſeize particular perſons at any time or ſeaſon, and in any place; in which ſenſe they are diſtinguiſhed from epidemical and endemic diſeaſes; the former whereof are peculiar to certain times or ſeaſons, and the latter to certain places or countries. See the articles EPIDEMICAL and ENDEMIC.

SPORTULA, in roman antiquity, a dole of meat or money, given by great men to the poor.

SPOTS, in aſtronomy, certain places of the ſun's or moon's diſc, obſerved to be either more bright, or darker, than the reſt; and accordingly, called faculæ and maculæ. See the articles FACULÆ and MACULÆ; as alſo SUN and MOON.

SPOUT, or WATER-SPOUT, in natural hiſtory, an extraordinary and dangerous meteor, obſerved at ſea, and ſometimes at land, called by the Latins typho and ſipho. Its firſt appearance is in form of a deep cloud, the upper part of which is white, and the lower black: then from the lower part of this cloud hangs, or rather falls down, what is properly called the ſpout, in form of a conical tube, biggeſt at top; and under this tube, there is always a great boiling and flying up of the water of the ſea, as in a *jet d'eau*. For ſome yards above the ſurface of the ſea, the water ſtands as a column or pillar, from the extremity whereof it ſpreads and goes off, as in a kind

kind of ſmoke. Frequently, the cone deſcends ſo low, as to touch the middle of this column, and continue for ſome time contiguous to it; though ſometimes it only points to it, at ſome diſtance, either in a perpendicular or oblique line. Frequently it is ſcarce diſtinguiſhable, whether the cone or the column appear the firſt, both appearing all of a ſudden againſt each other. But ſometimes the water boils up from the ſea to a great height, without any appearance of a ſpout pointing to it, either perpendicularly or obliquely. Indeed, generally, the boiling or flying up of the water has the priority, this always preceding its being formed into a column. Generally, the cone does not appear hollow, till towards the end, when the ſea-water is violently thrown up along its middle, as ſmoke up a chimney. Soon after this, the ſpout or canal breaks and diſappears; the boiling up of the water, and even the pillar, continuing to the laſt, and for ſome time afterwards; ſometimes till the ſpout form itſelf again, and appear a-new; which it ſometimes does ſeveral times in a quarter of an hour. See plate CCLIX. fig. 3.

M. de la Pyme, from a near obſervation of two or three ſpouts in Yorkſhire, deſcribed in the Philoſophical Tranſactions, gathers that the water-ſpout is nothing but a gyration of clouds by contrary winds, meeting in a point or center; and there, where the greateſt condenſation and gravitation is, falling down into a pipe or great tube, ſomewhat like Archimedes's ſpiral ſcrew; and, in its working and whirling motion, abſorbing and raiſing the water, in the ſame manner as the ſpiral ſcrew does; and thus deſtroying ſhips, &c. Thus, June the 21ſt, he obſerved the clouds mightily agitated above and driven together; upon which they became very black, and were hurried round, whence proceeded a moſt audible whirling noiſe, like that ordinarily heard in a mill. Soon after, iſſued a long tube or ſpout, from the center of the congregated clouds, wherein he obſerved a ſpiral motion like that of a ſcrew; by which the water was raiſed up. Again, Auguſt 15, 1687, the wind, blowing at the ſame time out of ſeveral quarters, created a great vortex and whirling among the clouds; the center whereof, every now and then, dropped down, in ſhape of a long, thin, black pipe, wherein he could diſtinctly behold a motion like that of a ſcrew, continually drawing upwards, and ſcrewing up, as it were, wherever it touched. In its progreſs it moved ſlowly over a grove of trees, which bent under it like wands in a circular motion. Proceeding, it tore off the thatch from a barn, bent a huge oak-tree, broke one of its greateſt branches, and threw it to a great diſtance. He adds, that, whereas it is commonly ſaid, the water works and riſes in a column, before the tube comes to touch it; this is doubtleſs a miſtake, owing to the fineneſs and tranſparency of the tubes, which do moſt certainly touch the ſurface of the ſea, before any conſiderable motion can be raiſed therein; but which do not become opake and viſible, till after they have imbibed a conſiderable quantity of water.

The diſſolution of water-ſpouts he aſcribes to the great quantity of water they have glutted; which by its weight impeding their motion, whereon their force, and even exiſtence, depends, they break and let go their contents; which uſe to prove fatal to whatever is found underneath. A notable inſtance hereof we have in the Philoſophical Tranſactions, related by Dr. Richardſon; for a ſpout in 1718 breaking on Emott-moor, nigh Coln, in Lancaſhire, the country was immediately overflowed.

In Pliny's time, the ſeamen uſed to pour vinegar into the ſea, to aſſuage and lay the ſpout, when it approached them: our modern ſeamen keep it off, by making a noiſe with filing and ſcratching violently on the deck, or by diſcharging great guns to diſperſe it.

SPOUTING FOUNTAIN. See the article FOUNTAIN.

SPRAIN, or STRAIN. See STRAIN.

SPRAT, in ichthyology, a ſpecies of clupea, with the lower jaw longeſt, and the belly very acute. See the article CLUPEA.

The ſprat has been generally, but erroneouſly, ſuppoſed a herring, not grown to its full ſize; its uſual length is about four or five inches, and its breadth ſomewhat more, in proportion, than in the herring; there is a ſpot on each ſide, near the extremity of the coverings of the gills. It is caught in moſt of our ſeas, and brought in ſurpriſing quantities to London.

SPREE,

SPREE, a river of Germany, which, rising in Bohemia, runs northward, thro' Luſatia, and, entering Brandenburg, viſits Berlin, and falls into the Havel, a little weſt of that city.

SPRING, *fons*, in natural hiſtory, a fountain or ſource of water, riſing out of the ground. See the article WATER.

Various have been the opinions of philoſophers concerning the origin of ſprings; but thoſe, which deſerve notice, are only the three following ones.

1. That the ſea-water is conveyed thro' ſubterraneous ducts, or canals, to the places where the ſprings flow out of the earth: but as it is impoſſible that the water ſhould be thus conveyed to the tops of mountains, ſince it cannot riſe higher than the ſurface, ſome have had recourſe to ſubterraneous heats; by which being rarified, it is ſuppoſed to aſcend in vapours through the bowels of the mountains. But as no ſufficient proof is brought of the exiſtence of theſe central heats, or of caverns in the mountains big enough to let the vapours aſcend, ſuppoſing ſuch heats, we ſhall not take up our reader's time with a formal refutation of this hypotheſis.

2. As to thoſe who advance the capillary hypotheſis, or ſuppoſe the water to riſe from the depths of the ſea through the porous parts of the earth, as it riſes in capillary tubes, or through ſand or aſhes, they ſeem not to conſider one principal property of this kind of tube, or this ſort of attraction: for though the water riſe to the top of the tube or ſand, yet will it riſe no higher, becauſe it is by the attraction of the parts above that the fluid riſes, and where that is wanting it can riſe no farther. Therefore, though the waters of the ſea may be drawn into the ſubſtance of the earth by attraction, yet it can never be raiſed by this means into a ciſtern, or cavity, to become the ſource of ſprings.

3. The third hypotheſis is that of the ſagacious naturaliſt, Dr. Halley, who ſuppoſes the true ſources of ſprings to be melted ſnow, rain-water, dew, and vapours condenſed.

Now in order to prove, that the vapours, raiſed by the heat of the ſun, from the ſurface of the ſeas, lakes, and rivers, are abundantly ſufficient to ſupply the ſprings and rivers with freſh water, the doctor made the following experiment: he took a veſſel of water, made of the ſame degree of ſaltneſs with that of the ſea, by means of the hydrometer; and having placed a thermometer in it, he brought it, by means of a pan of coals, to the ſame degree of heat with that of the air in the hotteſt ſummer. He then placed this veſſel with the thermometer in it, in one ſcale, and nicely counterpoſed it with weights in the other; after two hours, he found, that about the ſixtieth part of an inch was gone off in vapour, and conſequently in twelve hours, the length of a natural day, one tenth of an inch would have been evaporated.

From this experiment it follows, that every ten ſquare inches of the ſurface of the water yield a cubic inch of water in vapour per day, every ſquare mile 6914 tons, and every ſquare degree (or 69 engliſh miles) 33 millions of tons. Now, if we ſuppoſe the Mediterranean to be 40 degrees long, and 4 broad, at a medium, which is the leaſt that can be ſuppoſed, its ſurface will be 160 ſquare degrees, from whence there will evaporate 5280 millions of tons per day, in the ſummer-time. See the article SEA.

The Mediterranean receives water from the nine great rivers following, *viz.* the Iberus, the Rhine, the Tyber, the Po, the Danube, the Neiſter, the Boryſthenes, the Tanais, and the Nile; all the reſt being ſmall, and their water inconſiderable. Now let us ſuppoſe that each of theſe rivers conveys ten times as much water to the ſea as the Thames; which, as is obſerved, yields daily 76,032,000 cubic feet, which is equal to 203 millions of tons; and therefore all the nine rivers will produce 1827 millions of tons; which is little more than one third of the quantity evaporated each day from the ſea. The prodigious quantity of water remaining, the doctor allows to rains, which fall again into the ſeas, and for the uſes of vegetation, *&c.*

As to the manner in which theſe waters are collected, ſo as to form reſervoirs for the different kinds of ſprings, it ſeems to be this: the tops of mountains, in general, abound with cavities, and ſubterraneous caverns formed by nature to ſerve as reſervoirs; and their pointed ſummits, which ſeem to pierce the clouds, ſtop thoſe vapours which fluctuate in the atmoſphere, and being conſtipated thereby, they precipitate in water, and by their gravity eaſily penetrate through beds

beds of ſand and lighter earth, till they are ſtopped in their deſcent by more denſe ſtrata, as beds of clay, ſtone, &c. where they form a baſon or cavern, and work a paſſage horizontally, and iſſue out at the ſide of the mountain.

Many of theſe ſprings running down by the vallies, between the ridges of hills, and uniting their ſtreams, form rivulets or brooks; and many of theſe, again, uniting on the plain, become a river.

Different ſorts of SPRINGS. Springs are either ſuch as run continually, called perennial; or ſuch as run only for a time, and at certain ſeaſons of the year, and therefore called temporary ſprings. Others again are called intermitting ſprings, becauſe they flow and then ſtop, and flow and ſtop again: and, finally, reciprocating ſprings, whoſe waters riſe and fall, or flow and ebb, by regular intervals.

In order to account for theſe differences in ſprings, let A B C D E (plate CCLIX. fig. 4.) repreſent the declivity of a hill, whoſe ſection, from top to bottom, is ſhewn in the figure; in which let F G H be a cavern or baſon near the top, which collects the water gleeting through the ſtrata, and has a drain or duct leading to the ſide of the hill at B. It is evident, that, when the water ariſes to the drain H, it will deſcend through it to B, where it will break out in form of a fountain or ſpring, and will continue running while the reſervoir is ſupplied with water above the level F H, and after that it will become dry. Hence we ſee that a ſpring may be formed near the tops of the higheſt hills and mountains; but, on the very tops, it is impoſſible for them to be generated.

Intermitting ſprings, or thoſe which flow and ſtop by regular alternations and intermiſſions, may be thus accounted for: let I K L (*ibid.*) repreſent a cavity in the mountain, to which, at I, there is a feeding ſtream which brings the water from other parts; and at K, on the lower part, there goes a duct K *k* C, of a curved or crooked form, which conveys the water to the ſide of a hill at C, where it breaks out into a ſpring. Now, it is evident, that, as the water riſes in the cavern, it will alſo riſe in the duct, till the ſurface of the water I L be level with the higheſt part *k* of the duct, and then the water will deſcend from *k* to C, which point, being lower than the orifice of the duct at K, will exhauſt the cavern of all its water, and then the ſpring will ſtop, till the ciſtern is repleniſhed to the ſame level I K, by the feeding ſtream I, and then the fountain will play again. An artificial fountain of this kind may be alſo eaſily made.

Reciprocating ſprings, or thoſe which flow and ebb alternately, are occaſioned in the following manner: let M N O (*ibid.*) repreſent a reſervoir, fed by the ſtream P M, and alſo a ſiphon K *k* O, which brings water from another cavity above, as I K L; the duct N D carries the water to the ſide of the hill at D, and there makes a conſtant ſpring by virtue of a conſtant ſupply of water by the drain P M. The water at D will alſo flow and ebb alternately; for when the ſiphon K *k* O works, the ſurface of the water M O will be ſuddenly raiſed, and preſs upon the water at N with a greater force, by which means it will iſſue out at D with a greater velocity, and raiſe the ſurface, if confined; but when the ſiphon intermits or ceaſes, the momentum of the water at D is not ſo great as before, and then the ſpring will ſink or decreaſe.

In like manner we account for the riſing of water in wells. Thus ſuppoſe a well be ſunk at the foot of the hill at E, (*ibid.*) to ſuch a depth E V, as will bring the diggers to an eruption of a ſpring at V, whoſe water is brought by the duct R V (or many of them) from a cavity Q R S in the hill (or otherwiſe from a pond, a river, the ſea, &c.) it is evident the water in the well will riſe from the bottom V, to an altitude V T, where the ſurface of the water at T is upon a level with that in the reſervoir Q S, and thus conſtitutes a well.

Now, though every thing may not happen preciſely in the manner, as here repreſented, yet that it is in ſome way analogous to it, we believe no perſon will doubt, who has been at the Peak in Derbyſhire, or at Wookey-hole in Somerſetſhire, and ſeen the wonderful caverns, receptacles, and ſtreams of water, which nature has there furniſhed in the bowels of the mountains.

Medicinal virtues, &c. of SPRINGS. Theſe are owing to the different qualities and temperament of the ſtrata through which theſe waters may be collected, or paſs: if thoſe reſervoirs of water in the body of mountains be ſituated where mineral ores abound, or the ducts and feeding ſtreams run through mineral earths, it is eaſy to conceive that particles of metal will mix with, and be abſorbed by the

Fig. 1 SPHERIOD.

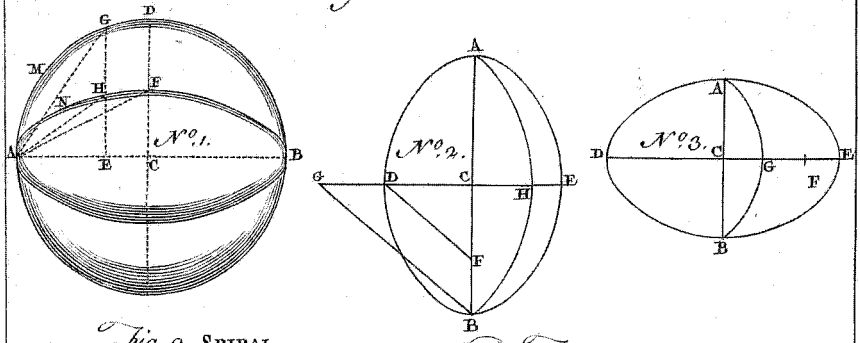


Fig. 2. SPIRAL.

Fig. 3. A WATER-SPOUT.

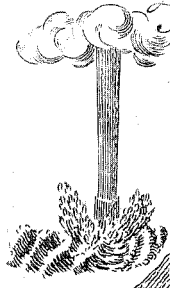


Fig. 4.
The Origin of SPRINGS.

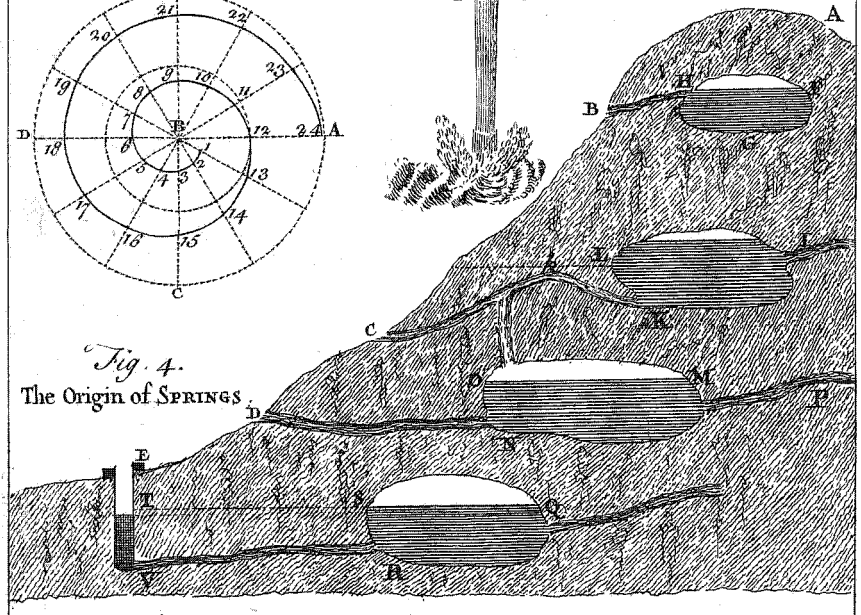


Fig. 5. The SQUIRREL.

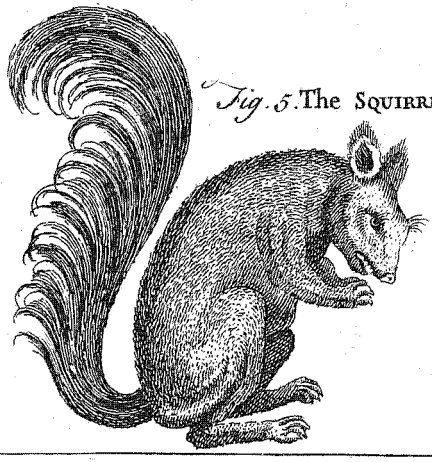
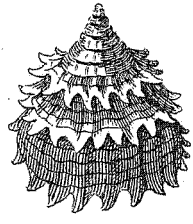


Fig. 6. SPUR-SHEL



water, which being ſaturated therewith, becomes a mineral ſpring or well. If ſalt, ſulphur, lime-ſtone, &c. abounds in the ſtrata, through which the water paſſes, it will then be ſaline, ſulphureous, lime-water, &c. If ſulphur and iron ſhould both abound in the parts of the hill, whence the waters come, the waters will partake of the warmth or heat which is occaſioned by the mixture of two ſuch ſubſtances in the earth, where they are found. See the articles MINERAL WATERS, CHALYBEATE WATERS, SEA-WATER, BATH-WATERS, &c.

SPRING, *ver*, in coſmography, implies one of the ſeaſons of the year; commencing, in the northern parts of the world, on the day the ſun enters the firſt degree of aries, which is about the twenty-firſt of March, and ending when the ſun leaves gemini. See the articles EQUINOX and SEASON.

SPRING, *elater*, in mechanics, denotes a thin piece of tempered ſteel, or other elaſtic ſubſtance; which, being wound up, ſerves to put ſeveral machines in motion by its elaſticity, or endeavour to unbend itſelf: ſuch is the ſpring of a clock, watch, and the like. See the articles ELASTICITY, CLOCK, WATCH, &c.

The ſpring of a lock, gun, piſtol, or the like, is a piece of ſteel, violently bent; which, being ſet at liberty, beats back the bolt of the lock, or ſtrikes down the cock. See the article LOCK, &c.

SPRING-TIDE. See the article TIDE.

SPRINGE, among ſportſmen, a device made of twiſted wire, to catch birds or ſmall beaſts.

SPRINGING *of a maſt*, in the ſea-language, is when it cracks, but is not quite broken in any part of it; as the partners, hounds, &c. See MAST, PARTNERS, &c.

SPRINGING *a leak*. See the article LEAK.

SPRINGY BODIES, the ſame with elaſtic ones; or ſuch as, having had their figure changed by the ſtroke of another body, can recover again their former figure, which bodies not elaſtic cannot do. See the article ELASTICITY.

SPROTAW, a town of Sileſia, fifteen miles weſt of Glogaw: eaſt long. 15° 45′, north lat. 51° 36′.

SPUNGE, *ſpongia*, in botany, a genus of ſubmarine plants, belonging to the *cryptogamia lithophyta* claſs: it conſiſts of a ſoft, tough, and elaſtic matter, formed uſually into rude maſſes of a cavernous ſtructure, and having very little of the appearance of plants.

Upon a nice examination, ſpunge appears to be compoſed of capillary fibres, which are hollow and implicated in a ſurpriſing manner; and are ſurrounded by thin membranes which arrange them into a cellular form. This ſtructure, no leſs than the conſtituent matter, of ſpunge, renders it the fitteſt of all bodies to imbibe a great quantity of any fluid, and upon a ſtrong preſſure to part with almoſt the whole quantity again.

Spunge pays, on importation, a duty of $7\frac{75}{100}$d. the pound; and draws back, on exportation, $6\frac{80}{100}$d.

Spunge calcined to a blackneſs, and reduced to powder, has been lately brought into great uſe as a ſweetner of the blood, and a diuretic: ſome have pretended even to cure leproſies with it, and others have extolled it againſt the bite of a mad dog; but theſe are virtues leſs certainly known of it.

In the larger and coarſer pieces of ſpunge, there are often ſmall ſtones found imbedded in the ſubſtance of the matter; and yet, more frequently, a cruſtaceous ſpary matter gathered round the ſurface of certain parts of the plants; both theſe ſubſtances are called by the common name of lapis ſpongiæ, the ſponge-ſtone; and both are recommended as diuretics, and remedies againſt the ſtone and gravel. See the article SPAR.

Pyrotechnical SPUNGES, are made of the large fungous excreſcences growing on old oaks, aſhes, &c. which being boiled in common water, then dried and well beaten, are put in a ſtrong lye prepared with ſalt-petre, and again dried in an oven. Theſe make the black match or tinder brought from Germany, uſed to receive and ſuſtain the fire ſtruck from a flint and ſteel, &c.

SPUNGE, is alſo uſed, in gunnery, for a long ſtaff or rammer with a piece of ſheep or lamb-ſkin wound about its end, to ſerve for ſcouring great guns, when diſcharged, before they are charged with freſh powder.

SPUNGE *of a horſe-ſhoe*, the part next the heel, where the calkins are made. See the article HORSE SHOES.

SPUNGING, in gunnery, the cleaning a gun's inſide with a ſpunge, in order to prevent any ſparks of fire from remaining in her, which would endanger the life of him who ſhould load her again.

SPUN-YARN, among ſailors, is a kind of line made from rope-yarn, and uſed for ſeizing or faſtening things together.

SPUR, a piece of metal, conſiſting of two branches encompaſſing a horſeman's heel, and a rowel in form of a ſtar, advancing out behind, to prick the horſe.

SPUR-SHELL, in natural hiſtory, a ſpecies of cochlea, with the edges of its volutions ſerrated; ſo that, in ſeveral poſitions, it reſembles a ſpur with large rowels. See plate CCLIX. fig. 6. and the article COCHLEA.

SPUR-WAY, a road through another's ground, through which one may ride, by right or cuſtom.

SPURGE, in botany, the engliſh name of the tithymalus. See TITHYMALUS.

SPURGE-LAUREL, *laureola*, *thymelæa*, or *daphne*. See the article DAPHNE.

SPURIOUS DISEASES, ſuch as, in ſome ſymptoms, cannot be reduced to any one kind; and, therefore, are denominated from thoſe with which they agree in moſt particulars: thus we ſay, a ſpurious or baſtard pleuriſy, quinzy, *&c.* See the articles PLEURISY, QUINZY, *&c.*

SPURKETS, in a ſhip, ſpaces between the upper and lower futtocks, or betwixt the rungs fore and aft.

SPURRY, in botany, the engliſh name of ſeveral ſpecies both of alſine and ſpergula. See ALSINE and SPERGULA.

SPUTUM, among phyſicians, denotes the ſame with the ſaliva, or ſpittle. See the article SPITTLE.

SPY, a perſon hired to watch the actions, motions, *&c.* of another; particularly of what paſſes in a camp. When a ſpy is diſcovered, he is hanged immediately.

SQUACCO, in ornithology, a bird of the heron-kind, of a yellowiſh colour, and the head and neck variegated with black, white and yellow. It is a native of the coaſt of the Levant. See HERON.

SQUADRON, in military affairs, denotes a body of horſe whoſe number of men is not fixed; but is uſually from one to two hundred.

Each ſquadron uſually conſiſts of three troops, of fifty men each. See the articles ARMY and HORSE.

SQUADRON *of ſhips*, a diviſion or part of a fleet, commanded by a vice-admiral, or commodore. See FLEET and NAVY.

SQUAIOTTA, in ornithology, a ſpecies of heron, of a brown colour, with a black and white creſt, ſomewhat larger than the ſquacco, or former ſpecies.

SQUALUS, the SHARK-KIND, in ichthyology, a numerous genus of fiſhes, of the chondropterygious order; the characters of which are theſe: the foramina of the gills are five on each ſide, and are ſituated in a longitudinal direction, from the ſides of the head down to the pectoral fins; the head is of a depreſſed form; the body is oblong, and is either rounded or angulated, and the ſkin is rough; the eyes ſtand on the ſides of the head; the tail is bifid, and the upper part longer than the under; the mouth is uſually tranſverſe, and in the under part of the roſtrum, not at its extremity.

The ſpecies of this genus, being very numerous, are arranged under the following ſubdiviſions. 1. Thoſe which have granulated teeth, as the ſaw-fiſh, and the ſmooth hound-fiſh. 2. Thoſe which have acute teeth, and prickles on the back; as the common hound-fiſh, the ſhagreen-fiſh, centrine and monk-fiſh. 3. Thoſe which have acute teeth, but no ſpines or prickles on the back; as the zygæna, or ballance-fiſh, the ſea-fox, and the tope. 4. Thoſe which have the roſtrum ſhorter than uſual; as the bounce, morgag, and blue and white ſharks. See the articles SAW-FISH, HOUND-FISH, *&c.*

SQUAMÆ, SCALES, in natural hiſtory. See the article SCALE.

SQUAMARIA, or ANBLATUM, in botany, a genus of the *didynamia-angioſpermia* claſs of plants, with a monopetalous ringent flower, both lips of which are entire, only the upper one is longeſt; the fruit is a roundiſh unilocular capſule, containing a great many round ſeeds.

SQUAMOUS, or SQUAMOSE, in anatomy, an appellation given to the ſpurious or falſe ſutures of the ſkull, becauſe compoſed of ſquamæ or ſcales like thoſe of fiſhes, or like tiles laid ſo as to reach over one another. See SKULL.

SQUARE, *quadratum*, in geometry, a quadrilateral figure, both equilateral and equiangular.

To find the area of a ſquare, ſeek the length of one ſide; multiply this by itſelf, and the product is the area of the ſquare.

SQUARE-NUMBER, the product of a number multiplied into itſelf. See INVOLUTION and POWER.

Thus 4, the product of 2 multiplied by 2; or 16, the product of 4 multiplied by 4, are ſquare numbers.

SQUARE ROOT, a number conſidered as the root of a ſecond power or ſquare number; or a number, by whoſe multiplication into itſelf, a ſquare number is generated. See the article EXTRACTION.

SQUARE BATTLE, or BATTALION *of men*, is one that hath an equal number of men in rank and file. See BATTLE.

Hollow SQUARE, in the military art, is a body of foot drawn up with an empty ſpace in the middle for the colours, drums, and baggage; faced and covered by the pikes every way, to keep off horſe.

SQUARE, *norma*, an inſtrument conſiſting of two rulers, or branches, faſtened perpendicularly at one end of their extremes, ſo as to form a right angle: it is of great uſe in the deſcription and menſuration of right angles, and laying down perpendiculars.

SQUATT, among miners, a ſmall bed of ore leſs valuable than a vein or load, as reaching only a little way.

SQUATINA, the MONK-FISH, or ANGEL-FISH, a ſpecies of ſqualus, with the mouth at the extremity of the head: it grows to about ſix feet in length, and is conſiderably thick in proportion. See the article SQUALUS.

SQUILL, *ſcilla*, in botany. See SCILLA.

SQUILLA, in zoology, a genus of inſects with ten legs, the foremoſt pair of which is cheliform, or made for pinching: the eyes are two, and the tail is foliated.

These are the characters of the ſhrimp, as alſo of the cray-fiſh, lobſter, and crab; of each of which there are numerous ſpecies. See CANCER, LOBSTER, &c.

SQUILLACE, a biſhop's ſee of the farther Calabria, in the kingdom of Naples, which gives name to the gulph of Squillace: eaſt long. 17°, north lat. 39°.

SQUINANCY, or ESQUINANCY, in medicine, the ſame with the quinzy. See the article QUINZY.

SQUINTING, *ſtrabiſmus*, in medicine and ſurgery. See the article STRABISMUS.

SQUIRREL, *ſciurus*, in zoology, the engliſh name of a genus of quadrupeds of the order of the glires, the fore-teeth of which are prominent; it has no canine teeth; and its legs are formed both for climbing and leaping.

The common reddiſh-brown ſquirrel, with a white belly, is a very lively little animal, with an extremely long and buſhy tail. See plate CCLIX. fig. 5.

But beſides this, there are ſeveral other ſpecies; as the american grey-ſquirrel, with a ſmaller tail, and twice as large as the common kind; the ceylon blackiſh ſquirrel, with a very large tail, and about the ſize of the common ſquirrel; the flying ſquirrel, with the ſides extended, ſo as to be able to leap from one tree to another at a great diſtance; and, laſtly, the barbary ſquirrel, of a blackiſh tawney-brown colour, with variegated ſides.

ST, an indeclinable term chiefly uſed to command ſilence.

The Romans had theſe two characters written over the doors of their eating rooms, as if one ſhould ſay *ſed tace*, or *ſilentium tene*. Porphyry obſerves, that the antients made a point of religion of it, not to ſpeak a ſingle word in paſſing in or out of the doors.

STABLE, a place or houſe for horſes, &c. furniſhed with ſtalls and proper apartments to contain their food, &c. See the article HORSE, &c.

Nothing conduces more to the health of a horſe than the having a good and wholeſome ſtable. The ſituation of a ſtable ſhould always be in a good air, and on a firm, dry, and hard ground, that in winter the horſe may go out and come in clean. It ſhould always be built ſomewhat on an aſcent, that the urine and other foulneſſes may be eaſily conveyed away by means of trenches or ſinks for that purpoſe. As there is no animal that delights more in cleanlineſs than the horſe, or that more abominates bad ſmells, care ſhould be taken that there be no hen-rooſt, hog-ſtie, or neceſſary houſe, near the place where the ſtable is to be built; for the ſwallowing of feathers, which is very apt to happen when hen-rooſts are near, often proves mortal to horſes; and the ſteams of a bog-houſe, or hog's-dung, will breed many diſtempers. The walls of a ſtable, which ought to be of brick rather than ſtone, ſhould be made of a moderate thickneſs, two bricks, or a brick and a half at leaſt, for the ſake of warmth in the winter, and to keep out the heat in the ſummer. The windows ſhould be made on the eaſt and north ſide of the building, that the north wind may be let in to cool the ſtables in the ſummer, and the riſing ſun all the year round, eſpecially in winter. The windows ſhould either be faſhed, or have large caſements, for the ſake of letting in air enough; and there ſhould always be cloſe wooden ſhutters, that the light may be ſhut out at pleaſure, by which means the horſe may be made to ſleep in the day as well as in the night,

when it is judged proper he ſhould do ſo. Many pave the whole ſtable with ſtone, but that part which the horſe is to lie on ſhould be boarded with oak-planks, which ſhould be laid as even as poſſible, and croſs-wiſe rather than length-wiſe; and there ſhould be ſeveral holes bored through them to receive the urine, and carry it off underneath the floor into one common receptacle; the ground behind ſhould be raiſed to a level with the planks, and it ſhould be paved with ſmall pebbles. There are two rings to be placed on each ſide of the ſtall, for the horſe's halter to run through, and a logger is to be fixed to the end of this ſufficient to poiſe it perpendicularly, but not ſo heavy as to tire the horſe, or to hinder him from eating; the beſt place for him to eat his corn in is a drawer or locker, made in the wainſcot partition, which need not be large, ſo that it may be taken out at pleaſure to clean it, by which means the common dirtineſs of a fixed manger may be avoided. Many people are againſt having a rack in their ſtables; they give the horſe his hay ſprinkled upon his litter, and if they think he treads it too much, they only nail up three or four boards, by way of a trough, to give it to him in: the reaſon of this is, that the continual lifting up of the head to feed out of the rack, is an unnatural poſture for a horſe, who was intended to take his food up from the ground, and makes him, as they expreſs it, withy-cragged. When there is ſtable-room enough, partitions are to be made for ſeveral horſes to ſtand in; theſe ſhould always allow room ſufficient for the horſe to turn about and lie down conveniently, and they ſhould be boarded up ſo high towards the head, that the horſes placed in ſeparate ſtalls may not be able to ſmell at one another, nor moleſt each other any way. One of theſe ſtalls ought to be covered in, and made convenient for the groom to lie in, in caſe of a match, or the ſickneſs of a horſe. Behind the horſes there ſhould be a row of pegs, to hang up ſaddles, bridles, and other utenſils; and ſome ſhelves for the bruſhes, pots of ointments, &c. The other requiſites for a ſtable are a dung-yard, a pump, and a conduit.

STABLESTAND, in the foreſt law, is one of the four evidences or preſumptions whereby a perſon is convicted of an intention to ſteal the king's deer in the foreſt; as when any perſon is found, at his ſtand in the foreſt, with his bow bent ready to ſhoot at a deer, or ſtanding cloſe by a tree with grey-hounds in a leaſh, ready to ſlip. See FOREST.

STABLO, a town of Germany, in the circle of Weſtphalia and biſhopric of Liege, ſituated ten miles ſouth of Limburg.

STACK *of wood*, among huſbandmen, a pile of wood three feet long, and as many broad, and twelve feet high.

STACHYARPAGOPHORA, in botany, the ſame with the celoſia. See the article CELOSIA.

STACHYS, BASE HOAR-HOUND, in botany, a genus of the *didynamia-gymnoſpermia* claſs of plants, the corolla whereof conſiſts of a ſingle ringent petal; the tube is very ſhort; there is no pericarpium; the calyx contains four oval and angular ſeeds.

This plant is cephalic, diuretic, and a promoter of the menſes.

STADIUM, an antient greek long-meaſure. See the article MEASURE.

Stadium was alſo the courſe or career wherein the Greeks ran their races. Vitruvius deſcribes it as an open ſpace 125 paces long, terminated at the two extremes with two poſts called by the Romans *carcer* and *meta*. Along the ſtadium was built a kind of amphitheatre, where the ſpectators were placed to ſee the athletæ exerciſe running, wreſtling, &c. There were ſtadia likewiſe covered over with colonnades and porticoes, ſerving for the ſame exerciſes in bad weather.

STADE, a town of Germany, in the circle of Lower Saxony and dutchy of Bremen, ſituated on the weſt ſide of the river Elbe, ſeventeen miles weſt of Hamburgh.

STADTHOLDER, STADTHOULDER, or STATHOLDER, the principal governor or magiſtrate of the united provinces.

The ſtadtholder ſeems to be impowered, either directly or by his influence, to change both the deputies, magiſtrates, and officers in every province and city. He is preſident in the ſtates of every province, though he has not ſo much as a ſeat or vote in the ſtates-general: but as he influences the ſtates of each province to ſend what deputies he pleaſes to the ſtates-general, he has, in effect, the appointing the perſons that conſtitute the ſtates general, and may be deemed ſovereign of the united provinces. The ſtadtholders

tholders had once a very great power. We find one of their ſtadtholders appointing what towns ſhould ſend deputies, or members, to the aſſembly of the ſtates of Holland: but the ſtadtholderſhip was never hereditary till now, when in the year 1747 it was made ſo in the family of Orange.

It is obſerved that the ſtates paſſed by the ſtadtholder's eldeſt ſon, and appointed his younger ſon, prince Maurice of Orange, their ſtadtholder: and at other times they have ſuppreſſed the ſtadtholderſhip intirely. The ſtadtholder always, in the council of ſtate, when the votes happen to be equal, has a deciſive voice.

STAEHELINA, in botany, a genus of the *ſyngeneſia-polygamia-æqualis* claſs of plants, the general corolla whereof conſiſts of uniform floſcules ſcarce riſing above the cup: the proper corolla is monopetalous and funnel-ſhaped: the limb is quinquifid, equal, acute, and campanulated: there is no pericarpium: the ſeed contained in the cup is ſolitary, oblong, very ſhort, tetragonal, and coronated with a downy pap of the length of the cup.

STAFF, *baculus*, an inſtrument ordinarily uſed to reſt on in walking. The ſtaff is alſo frequently uſed as a kind of natural weapon both of offence and defence, and for ſeveral other purpoſes.

STAFF, in muſic, five lines on which, with the intermediate ſpaces, the notes of a ſong, or piece of muſic, are marked.

Guido Aretin, the great improver of modern muſic, is ſaid to be the firſt who introduced the ſtaff, marking his notes by ſetting points (.) up and down them to denote the riſe and fall of the voice; and each line and ſpace he marked at the beginning of the ſtaff with pope Gregory's ſeven letters, A, B, C, D, E, F, G. See the article NOTE.

But others will have this practice of an older date; and Kircher particularly affirms, that in the Jeſuits Library at Meſſina, he found a greek manuſcript of hymns above ſeven hundred years old, wherein ſome hymns were written, on a ſtaff of eight lines, marked at the beginning with eight greek letters. The notes, or points, were on the lines, but no uſe made of the ſpaces.

STAFF, BASTON, or BATTON, in heraldry. See BASTON.

Back-STAFF. See BACK-STAFF.

Fore-STAFF. See FORE-STAFF.

Paſtoral-STAFF. See PASTORAL.

STAFF-OFFICERS. See OFFICERS.

STAFFORD, the county town of Staffordſhire, is ſituated one hundred and thirty miles north-weſt of London.

It ſends two members to parliament.

The county of Stafford is bounded by Cheſhire, on the north-weſt; by Derbyſhire, on the north-eaſt; by Worceſterſhire, on the ſouth; and by Shropſhire, on the weſt.

STAG, in zoology, a ſpecies of the cervus, with ramoſe, cylindric and crooked horns. See the article CERVUS.

This is a very ſtately and beautiful animal. People are apt to confound it with the common fallow deer, but with great impropriety, being of twice the ſize, and different in many other reſpects: the head is remarkably large: the neck ſtrong and thick: the eyes are full and large: the ears long and patulous: the horns tall, almoſt erect, and of a beautiful form; they riſe each with a ſingle and elegant ſtem, which continues its form to the top, only ſending off branches and divarications: they are hairy when once formed, but afterwards they become very ſtrong and loſe that downy appearance. The body of the ſtag is rounded and plump: the back ſomewhat flatted, and the belly prominent: the legs are long: the hoofs cloven: the fur deep, thick, and of a tawny-reddiſh colour.

STAG-BEETLE. See CERVUS-VOLANS.

STAG-HUNTING. See HUNTING.

STAGE, in the modern drama, the place of action and repreſentation, included between the pit and the ſcenes, and anſwering to the proſcenium, or pulpitum, of the antients.

The laws of the ſtage are the rules and decorums to be obſerved, with regard to the œconomy and conduct of a dramatic performance to be exhibited on the ſtage. Theſe relate principally to the unities, the diſpoſition of the acts and ſcenes, the unravelling, *&c.* See the articles DRAMA, ACTION, *&c.*

STAGGERS, or STAVERS, in the manege. See STAVERS.

STAIN, a town of Germany, in the circle of Auſtria, ſituated on the Danube, one hundred and forty miles weſt of Vienna.

STAINES, a town of Middleſex, ſituated nineteen meaſured miles weſt of London.

STAIR-CASE, in architecture, an aſcent incloſed between walls, or a balluſtrade, conſiſting of ſtairs, or ſteps, with landing-

ing-places and rails, ſerving to make a communication between the ſeveral ſtories of a houſe.

The conſtruction of a complete ſtair-caſe is one of the moſt curious works in architecture. The common rules to be obſerved therein are as follow: 1. That it have a full free light, to prevent accidents of ſlipping, falling, *&c.* 2. That the ſpace over head be large and airy, which the Italians call *un bel ſfocato*, i. e. good ventilation, in regard a man ſpends much breath in mounting. 3. That the half-paces, or landing-places, be conveniently diſtributed for repaſſing in the way. 4. That to prevent rencounters, *&c.* the ſtair-caſe be not too narrow: however, this laſt is to be regulated by the quality of the building. 5. That care be taken in placing the ſtair-caſe, ſo as the ſtairs may be diſtributed without prejudice to the reſt of the building.

The kinds of ſtair-caſes are various: in ſome the ſtairs are ſtraight, in others winding, in others both ways, or mixed. Again, of ſtraight-ſtairs, called alſo fliers: ſome fly directly forwards, others are ſquare, others triangular, and others are called french flights. Of winding-ſtairs, called alſo ſpiral or cockle-ſtairs: ſome are ſquare, ſome circular, and ſome elliptical: and theſe again are various; ſome winding round a ſolid, and others round an open newel. Laſtly, of mixed-ſtairs: ſome are called dog-legged, others both wind about a ſolid newel, and fly about a ſquare open newel.

Stair-caſes being of great importance in building, it will be neceſſary to give a particular account of each kind. Firſt, ſtraight-ſtairs are ſuch as always fly; that is, proceed in a right line, and never wind; whence their denomination. Of theſe there are ſeveral kinds, as, 1. Straight-fliers, or plain-fliers, which proceed directly from one floor to another, without turning either to the right or left: theſe are ſeldom uſed, except either for garret or cellar-ſtairs. 2. Square-fliers, which fly round the ſides of a ſquare newel, either ſolid or open, having at every corner of the newel a ſquare half ſtep, taking up one fourth of a circle, ſo that they fly from one half pace, or ſtep, to another; and the length of the ſtairs is perpendicular to the ſide of the newel. 3. Triangular-fliers are thoſe which fly round by the ſides of a triangular newel, either ſolid or open, having at each corner of the newel a trapezial half-ſtep, taking up two thirds of a circle, ſo that they fly from one half ſtep to another, and their length is perpendicular to the ſide of the newel. 4. French-fliers, thoſe which fly firſt directly forwards, till they come within the length of a ſtair of the wall, and then have a ſquare half-pace, from which you immediately aſcend to another half-pace, from which the ſtairs fly directly back again, parallel to their firſt flight.

Secondly, Winding-ſtairs are ſuch as always wind and never fly: of theſe there is great variety; as, 1. Circular winding ſtairs; of which there are four kinds, *viz.* ſuch as wind about a ſolid newel, the fore-edge of each being in a right line, pointing to the center of a newel; commonly uſed in church-ſteeples and great old houſes: ſuch as wind round an open newel, the fore ſide of each being in a right line, pointing to the center of the newel, as thoſe in the monument of London: ſuch as wind round a ſolid newel, only the fore-ſide of each an arch of a circle, either concave or convex, pointing near to the circumference of the newel, and ſuch as reſemble the laſt in all other reſpects, ſave that they have an open newel. Any of theſe winding-ſtairs take up leſs room than the other kinds. In ſtairs that wind round a ſolid newel, architects make the diameter of the newel either one ſixth, or one fourth, or one third, or three ſevenths, of the diameter of the ſtair-caſe, according as that is in bigneſs: if very ſmall, the newel is but one ſixth; and if large, three ſevenths, *&c.* In ſtairs that wind round an open newel, Palladio orders the newel to be one half of the diameter of the ſtair-caſe, though there does not appear any reaſon why the newel here ſhould not be proportioned to the ſtair-caſe, as in the former. As to the number of ſtairs in each revolution, Palladio orders, that if the ſtair-caſe be ſix or ſeven feet diameter, the ſtairs in each revolution to be twelve; if the diameter be eight, the ſtairs to be ſixteen; or if nine or ten, the ſtairs to be twenty; and if eighteen, to be twenty-four. 2. Elliptical winding-ſtairs, whereof there are two kinds, the one winding round a ſolid, the other round an open newel: they are much of the ſame nature with circular ſtairs, excepting that in the one the newel is a circle, and in the

the other an ellipſis. 3. Square winding-ſtairs are ſuch as wind round a ſquare newel, either ſolid or open, the fore ſide of each ſtair being a right line pointing to the center of the newel. 4. Triangular winding ſtairs are ſuch as wind round a triangular newel, the fore-ſide of each being a right line pointing to the center of the newel. 5. Columinated winding-ſtairs. Palladio mentions a ſtair-caſe in Pompey's portico, at Rome, ſet on columns, ſo as the light they receive from above may diſtribute itſelf to all parts alike. 6. Double winding-ſtairs. Scamozzi mentions a ſtair-caſe in this form made by Piedro del Bergo and Jean Coſſin, at Sciamburg, in France, in the king's palace. It is ſo contrived, that the one aſcending and the other deſcending, ſhall never meet. Dr. Grew deſcribes a model of this kind of ſtair-caſe kept in the Muſæum of the royal ſociety. The foot of one of the ſtair-caſes, he ſays, is oppoſite to that of the other, and both make a parallel aſcent, and within the ſame cylinder: the newel in the middle is hollow, and built with long apertures, to convey light from candles placed at bottom, and at the ſides of the newel, in both caſes. 7. Quadruple winding-ſtairs. Palladio mentions a ſtair-caſe of this form in the caſtle of Chambor, near Blois. It conſiſts of four ſtair-caſes, carried up together, having each its ſeveral entrance, and going up one over another in ſuch a manner as that being in the middle of the building, the four ſerve to lead to four apartments, ſo that the people of the one need not go up and down the ſtairs of the other; yet being open in the middle, they all ſee each other paſs.

Thirdly, mixed-ſtairs are ſuch as partly fly and partly wind; whence ſome call them fliers and winders. Of theſe there are ſeveral kinds: as, 1. Dog-legged-ſtairs, which firſt fly directly forwards, then wind a ſemi-circle, and then fly directly backwards parallel to that. 2. Square-fliers and winders have a ſquare newel, either ſolid or open, and fly by the ſides of the newel, winding a quadrant of a circle at each corner. 3. Solid and open newelled fliers and winders are of two kinds: the one winds the quadrant of a circle about a ſolid newel, then flies by the ſide of a ſquare open newel, then winds again by the ſide of a ſolid newel, then flies again as before, and ſo alternately. The other flies firſt, then winds, then flies again, alternately.

The dimenſions of ſtairs are differently aſſigned by different authors; but, however, they agree in this, that they muſt not be more than ſix, nor leſs than four inches high; nor more than eighteen, nor leſs than twelve inches broad; nor more than ſixteen, nor leſs than ſix feet long, each ſtair. But theſe meaſures regard only large and ſumptuous buildings; for in common and ordinary houſes they may be ſomething higher and narrower, and much ſhorter; yet even in theſe the ſtairs are not to exceed ſeven, or at moſt eight inches in heighth, nor be leſs than nine or ten inches in breadth, nor three feet in length. To reduce the dimenſions of ſtairs to ſome natural, or at leaſt geometrical, ſtandard, Vitruvius borrows the proportion of the ſides of a rectangled triangle, which the antient ſchool expreſſed by the numbers 3, 4, and 5; the firſt for the perpendicular height, from the ſtair-head to the ground; the ſecond for the horizontal breadth; and the third for the whole ſlope, or inclination, from the edge of one ſtair to that of another. But this rule is laid aſide, and with good reaſon, by the modern builders; for on this principle, the lower the ſtairs, the narrower they muſt be; and ſtairs, for inſtance, four inches high, ſuch as we find mentioned by antient architects, muſt be but five inches and one third broad.

One rule to be regarded in the making of ſtairs, is, that they be laid ſomewhat ſloping, or a little higher behind, that the foot may, as it were, both aſcend and deſcend at the ſame time; which, though it is obſerved by few, is found a ſecret and delicate deception of the pains in mounting.

STAKE, the name of a ſmall anvil, uſed by ſmiths; ſometimes it ſtands on a broad iron-foot on the work-bench, to be moved up and down occaſionally; and ſometimes it hath a ſtrong iron-ſpike at the bottom, by which it is fixed to ſome place on the work-bench. Its uſe is to ſet ſmall and cold work ſtraight, by hammering it on the ſtake; or to cut or punch upon the cold chiſſel or cold punch.

STALACTITÆ, or STALACTAGNIA, STONY ICICLES, in natural hiſtory, cryſtalline ſpars formed into oblong, conical, round, or irregular bodies, compoſed

compoſed of various cruſts, and uſually found hanging in form of icicles from the roofs of grottos, &c. See SPAR.

Of this claſs there are various ſpecies, as the hard, white ſtalactitæ; the white, ſhattery ſtalactitæ; and the yellow, ſhattery, cryſtalline ſtalactitæ, &c.

STALBRIDGE, a market-town of Dorſetſhire, ſituated eighteen miles north of Dorcheſter.

STALE, among ſportſmen, a living fowl put in a place to allure and bring others where they may be taken. For want of theſe, a bird ſhot, his entrails taken out, and dried in an oven in his feathers, with a ſtick thruſt through to keep it in a convenient poſture, may ſerve as well as a live one.

Stale is alſo a name for the urine of cattle. See the article URINE.

STALIMENE, an iſland in the Archipelago, or Egean-ſea.

STALK, in botany, that part of a plant which riſes immediately from the root, and which ſupports the leaves of the flowers and the fruit.

The term ſtalk is uſed on all occaſions; but in ſpeaking of the graſſes and gramineous plants, the word culm is uſed in its place, to diſtinguiſh that peculiar kind of ſtalk, which is general to all theſe plants, and is not found in any others.

STALKING, a term uſed in fowling, and applied to a kind of ſcreen, or device, to hide the fowler and amuſe the game, while he gets within ſhot. Of ſuch devices there are ſeveral kinds, *viz.* the ſtalking-hedge, being an artificial hedge two or three yards long, and about a yard and a half high, made with ſmall wands, to be light, and portable, yet buſhed out, like a real hedge, with ſtakes, to ſupport it, while the fowler takes his aim. Stalking-horſe, is an old horſe trained up for the purpoſe, which will gently walk up and down, as you would have him, in water, &c. beneath whoſe fore-ſhoulder the ſportſman ſhelters himſelf and gun. When thus got within ſhot he takes aim from before the forepart of the horſe, which is much better than ſhooting under his belly. For change, when the fowls become ſo uſed to the ſtalking-horſe as to know it, ſome ſtalk with an ox, cow, deer, or the like: others uſe a ſtalking-tree, and others a ſtalking-buſh.

STALLION, or STONE-HORSE, in the manege, an ungelt horſe, deſigned for the covering of mares, in order to propagate the ſpecies. See MARE.

In the choice of ſtallions for mares, care ſhould be taken that they have no natural blemiſh of any kind whatever, ſuch as moon-eyes, watery eyes, ſplints, ſpavins, curbs, &c. becauſe, in that caſe, the colts will have the defect hereditary from the parent. On the other hand, the ſtallion ſhould be choſe able, high-ſpirited, fair-coloured, and fine-ſhaped. As to his age, he ſhould not be younger to cover a mare than four years, nor older than twenty. Let the ſtallion be ſo highly fed as to be full of luſt and vigour: and being brought to the place where the mares are, take off his hinder ſhoes, and let him cover a mare in hand twice or thrice, to keep him ſober; then pull off his bridle and turn him looſe to the reſt of the mares, which ſhould be in a convenient cloſe, with ſtrong fences and good food, and there leave him till he has covered them all, ſo that they will bear him no longer; by which time his courage will be pretty well cooled. Ten or twelve mares are enough for one ſtallion, in one and the ſame year. It will be neceſſary to leave a little ſhed, or hovel, for him in the field, to which he may retreat from the rain, wind, or ſun. In this ſhed there ſhould be a rack and manger, to feed him during his covering time. After he has done with the mares he ſhould be removed to freſh paſture. For the further ordering of a ſtallion, before he is to cover, the following inſtructions are of uſe. Feed him, for three or four months before covering, with good oats, peaſe, or beans, or with coarſe bread and a little hays, but a good deal of wheat-ſtraw; carrying him twice a-day to water; walking him up and down, for an hour, before he has drank, but without making him ſweat.

STAMFORD, a borough-town of Lincolnſhire, ſituated thirty-five miles ſouth of Lincoln.

It ſends two members to parliament.

STAMINA, according to moſt botaniſts, are the male organs of generation in flowers, conſiſting of two parts, a filament and anthera, though ſometimes the anthera ſtands alone, See the articles ANTHERA and FILAMENT.

Mr. Tournefert takes the uſe of the ſtamina to be as it were ſo many excretory canals for diſcharging the growing embryo

bryo of its redundant juices; and of theſe excrements of the fruit, he takes that farina, or duſt, found in the apices, to be formed. But other writers, as Geoffroy, and Linnæus in particular, aſſign the ſtamina a nobler uſe. theſe authors, explaining the generation of plants, in a manner analogous to that of animals, maintain the uſe of the ſtamina to be that of ſecreting, in their fine capillary canals, a juice, which being collected, hardened, and formed into a farina, or duſt, in the tips of the apices, is thence, when the plant arrives at maturity, diſcharged by the burſting of the apices upon the top of the piſtil, whence is a paſſage for it to deſcend into the uterus, where being received, it impregnates and fecundifies the plant. See BOTANY, GENERATION *of plants*, FARINA, and PISTIL.

On this principle it may be ſaid, that the ſame flower contains both ſexes, which contribute each their part to the generation; that the ſtamina are the male part, and the farina, which is always found of an oily glutinous nature, the ſeminal liquor; and that the piſtil is the female part, which conducts the ſemen to the ova or embryos. Among the writers of the preſent age, who oppoſe this doctrine, is Dr. Alſton, profeſſor of botany at Edinburgh, who, in an expreſs diſſertation on the ſexes of plants, publiſhed in the Phyſical Eſſays, undertakes to overthrow all the arguments in favour of the ſexes of plants, by repeated experiments. This learned author, conſidering that there are ſeveral ſpecies of vegetables which bear flowers on one plant and ſeeds on another, as ſpinacia mercurialis, cannabis, *&c.* in order to determine the controverſy, thought of training up one or more of theſe ſeed-bearing plants at a ſufficient diſtance from thoſe that carry flowers, and obſerving the conſequence. To this end, in ſpring 1737, he tranſplanted three ſets of the common ſpinage, long before it could be known whether they were flowering or ſeed-bearing plants, from a little bed, on which it was raiſed, into a place of the garden full eighty yards diſtant, and almoſt directly ſouth, there being two hawthorn and three holly-hedges, all pretty thick and tall, between them and their ſeed-bed, and no other ſpinage in the garden, nor ſo near them by far; all the three, we are told, proved fertile plants, and ripened plenty of ſeeds; and further, they were ſown, grew, and proſpered as well as any ſpinage could do.

The ſame author, in ſpring 1741, made other ſeparate experiments on the common hemp, and the french mercury; each of which plants, notwithſtanding they were planted in a very high incloſure, many hundred yards diſtant from any other of the ſame claſs of plants, he aſſures us, ripened fertile ſeeds.

For the arguments and experiments of the ſexualiſtæ, or thoſe who eſtabliſh the claſſes of plants upon the differences of the ſexes and parts of fructification in plants, ſee the article GENERATION.

STAMINA, in the animal body, are defined to be theſe ſimple original parts, which exiſted firſt in the embryo, or even in the ſeed, and by whoſe diſtinction, augmentation, and accretion, by additional juices, the animal body, at its utmoſt bulk, is ſuppoſed to be formed. See GENERATION.

STAMINEOUS, in botany, a term uſed by authors, for thoſe flowers of plants which have no petals, or flower-leaves, but conſiſt only of a number of ſtamina and piſtils, placed in a cup. This cup is ſometimes miſtaken for a flower, and its leaves thought to be true petals, but they remain when the ſtamina are fallen, and become the capſules, containing the ſeed; which, according to Tournefort, is the true character of a cup, not of a flower.

STAMP-DUTIES, certain impoſitions laid on all parchment and paper, on which deeds, grants, or other inſtruments, or any proceſs in law or equity, are ingroſſed or written. Theſe duties when firſt granted were from forty ſhillings for letters patent, *&c.* to ſix pence for the uſual deeds; and one penny for declarations, pleadings, *&c.* They have been, in general, doubled and trebled, by ſubſequent ſtatutes; and the common ſtamp now is the treble ſix-penny. Perſons writing or ingroſſing any thing charged with the duty on parchment or paper, before it is ſtamped, or if it be marked with any lower duty than what is required, are liable to forfeit 5l. and the deed ſhall not be deemed good in law, till ſuch penalty is paid, and the ſame be ſtamped, *&c.*

The ſtamp-duties are alſo extended to almanacs, news-papers, pamphlets, cards, and dice. Almanacs printed on one ſide of a ſheet, muſt be on a penny ſtamp; and the firſt ſheet of book-almanacs on a two penny-ſtamp, under a penalty of 10l. News-papers, printed on a half-ſheet, are chargeable with ½d. ſtamp; or if upon a whole ſheet, 1d. All

pamphlets above a ſheet, and under ſix ſheets in octavo, twelve in quarto, or twenty in folio, are ſubject to a ſtamp-duty of 2s. per ſheet, which is to be paid within ſix days, if printed within the bills of mortality, or within fourteen days if printed at a greater diſtance, on penalty of 20l. and the loſs of the property of the copy. But the votes of the houſe of commons, public prayers or thankſgivings, printed by authority, and ſermons, are exempted. Cards pay a duty of 6d. each pack: and the penalty for expoſing cards to ſale, not having one card ſtamped, is 5l. or not incloſed in paper and thread, ſealed and ſtamped 10l. Dice pay 5s. a pair ſtamp-duty; the perſon expoſing unſtamped dice to ſale, forfeits 5l. for each dice: and whoever files, ſquares, or new-ſpots dice that have been played with, forfeits 10l.

STAMPS, in metallurgy, a ſort of large peſtles, lifted up by water-wheels, and ſerving to beat to powder the ores, and the refuſe of ores, of metals. This engine is called the ſtamping-mill, and ſometimes the knocking-mill. See MILL.

STAMPALIA, an iſland of the Archipelago, about fifty miles in circumference, ſituated in eaſt lon. 26° 30′, and north lat. 36° 20′.

STANCHEON. See PUNCHEON.

STANCHION, or STANCHIONS, in a ſhip, thoſe pillars, which being ſet up pillar-wiſe, do ſupport and ſtrengthen the waſte-trees.

STAND, in commerce, a weight, from two hundred and a half to three hundred, of pitch.

Stable-STAND. See STABLE-STAND.

STANDARD, in war, a ſort of banner, or flag, borne as a ſignal for the joining together of the ſeveral troops belonging to the ſame body. See FLAG, *&c.*

The ſtandard is uſually a piece of ſilk, a foot and a half ſquare, on which are embroidered the arms, device, or cypher, of the prince, or of the colonel: it is fixed on a lance, eight or nine feet long, and is carried in the center of the firſt rank of a ſquadron of horſe.

The ſtandard is uſed for any martial enſign of horſe, but more particularly for that of the general, or the royal ſtandard: thoſe borne by the foot are rather called colours.

STANDARD, in commerce, the original of a weight, meaſure, or coin, committed to the keeping of a magiſtrate, or depoſited in ſome public place, to regulate, adjuſt, and try the weights uſed by particular perſons in traffic. See the articles COIN, MEASURE, *&c.*

The juſtneſs of weights and meaſures is of that importance to the ſecurity and good order of trade, that there is no civilized nation, but makes it a part of their policy, to preſerve the equality thereof, by means of ſtandards. The ſtandards of weights and meaſures in England are appointed by magna charta to be kept in the exchequer, by a ſpecial officer, called the clerk or comptroller of the market. See the article CLERK *of the market.*

The ſtandard of gold-coin is twenty-two carats of fine gold and two carats of alloy in the pound weight troy: and the french, ſpaniſh, and flemiſh gold are nearly of the ſame fineneſs. The pound weight is cut into forty-four parts and a half, each current for twenty-one ſhillings.

The ſtandard of ſilver is eleven ounces and two penny-weights of ſilver, and eighteen penny-weights of alloy of copper. Whether gold or ſilver be above or below ſtandard, is found by aſſaying, and the hydroſtatical ballance. See the articles ASSAYING and HYDROSTATICAL BALLANCE.

STANDARDS, or STANDELS, in huſbandry, are young trees, reſerved at the felling of woods, for the growth of timber.

STANDING, in the ſea-language. Standing part of the ſheet, is that part of it which is made faſt to a ring at the ſhip's quarter. Standing part of a tackle, is the end of the rope where the block is faſtened. Standing ropes, are thoſe which do not run in any block, but are ſet taught or let ſlack, as occaſion ſerves; as the ſheet-ſtays, back-ſtays, or the like.

STANDON, a town of Hertfordſhire, ſituated under the meridian of London, and ſeven miles north of Hertford.

STANHOPE, a market-town of Durham, ſituated ſixteen miles weſt of Durham.

STANLEY, a town of Glocеſterſhire, ſituated twelve miles ſouth of Glocеſter.

STANNARIES, the mines and works where tin is dug and purified, as in Cornwal, Devonſhire, *&c.* There are four courts of the ſtannaries in Devonſhire, and as many in Cornwal, and great liberties were granted them by ſeveral acts of parliament, in the time of Edward I. *&c.* though ſomewhat abridged under Edward III. and Charles I.

STANTON, a town of Lincolnſhire, ſituated ſeventeen miles eaſt of Lincoln, under the meridian of London.

STANTS,

STANTS, a town of Switzerland, capital of the canton of Underwald, ſituated on the lake of Lucern, twenty-five miles ſouth of Zurich.

STANZA, in poetry, a certain ſtated number of verſes, generally containing a perfect ſenſe, that ought to end with ſome lively and ingenious thought, or juſt and pertinent reflection.

The word is italian, and literally ſignifies a ſtand, or ſtation, becauſe of the pauſe to be made at the end of each ſtanza, or complete ſenſe. What the couplet is in ſongs, and the ſtrophe in odes, the ſtanza is in the greater and graver pieces. The Italians, indeed, ſcarce write any poems, but they divide them into ſtanzas. There are ſtanzas of four, ſix, eight, ten, and twelve verſes; and ſometimes of an uneven number, but theſe laſt are ſomewhat more difficult to execute, by reaſon of the three verſes to one rhyme.

The uſe of ſtanzas in tragedy and comedy is condemned by all the beſt critics; for though we ſpeak verſe on the ſtage, it is preſumed we are ſpeaking proſe. Stanzas ſhew a degree of ingenuity on the part of the poet, which has nothing of nature in it on the part of the actor: add to this, that ſtanzas are not fit to expreſs but a few of the paſſions.

STAPELIA, in botany, a genus of the *pentandria-digynia* claſs of plants, the corolla whereof conſiſts of a large, plane, ſingle petal, quinquifid beyond the middle; the fruit conſiſts of two oblong ſubulated folicles, made up of only one valve, and containing one cell; the ſeeds are numerous, imbricated, compreſſed, and pappoſe.

STAPES, in anatomy, one of the officula auditoria, being a little bone ſituated in the cavity of the feneſtra ovalis: thus called from its reſembling a ſtirrup. See EAR. The head of this bone is joined to the longer leg of the incus; its baſis ſtands in the feneſtra ovalis of the labyrinth of the ear; and its two lateral parts have their internal ſurface furrowed; the head is articulated by arthrodia with the leg of the incus. See the article INCUS.

STAPHISAGRIA, in botany, a name for the delphinium. See DELPHINIUM.

STAPHYLÆA, BLADDER-NUT, in botany, a genus of the *pentandria-trigynia* claſs of plants, the corolla of which conſiſts of five oblong erect petals, of the length of the cup; the fruit is compoſed of three inflated flaccid capſules, affixed together longitudinally, by a ſuture, pointed at the tops, and opening on the inſides; the ſeeds are two, oſſeous, ſubgloboſe, with oblique points, and an orbicular hole at the ſide of the apex.

STAPHYLINUS, in botany, a name given by ſome authors to the daucus, or carrot. See the article DAUCUS.

STAPHYLINUS, in zoology, a genus of inſects, the antennæ of which are ſlender and filiform; there are two veſicles, ſituated above the tail; the exterior wings are dimidiated and ſhort, the interior ones are covered by them.

STAPHYLODENDRON, in botany, the name by which Tournefort calls the ſtaphylæa. See STAPHYLÆA.

STAPLE primarily ſignifies a public place or market, whither merchants, *&c.* are obliged to bring their goods to be bought by the people, as the Greve, or the places along the Seine, for ſale of wines and corn, at Paris, whither the merchants of other parts are obliged to bring thoſe commodities.

Formerly the merchants of England were obliged to carry their wool, cloth, lead, and other like ſtaple-commodities of this realm, in order to utter the ſame by wholeſale; and theſe ſtaples were appointed to be conſtantly kept at York, Lincoln, Newcaſtle upon Tyne, Norwich, Weſtminſter, Canterbury, Chicheſter, Wincheſter, Exeter, and Briſtol; in each whereof a public mart was appointed to be kept, and each of them had a court of the mayor of the ſtaple, for deciding differences, held according to the law-merchant, in a ſummary way.

The ſtaple-commodities of this kingdom are ſaid by ſome to be theſe, *viz.* wool, leather, wool-fells, lead, tin, butter, cheeſe, cloth, *&c.* but others allow only the firſt five to be ſtaple-commodities.

Staple ſignifies alſo a city or town, where the merchants jointly agree to carry certain commodities. The principal ſtaples at preſent are Amſterdam, for all goods from the Eaſt-indies, Spain, the Mediterranean, and the Baltic; Fluſhing, for thoſe of the Weſt-indies; Middleburgh, for french wines; Dort, for rheniſh wines and engliſh cloth; Verre, in Zealand, for ſcotch merchandizes, *&c.* The ſtaples in the Levant, are ſuch cities where the Engliſh, French, Dutch, Italians, *&c.* have conſuls, factors, and magazines; and whither they ſend veſſels regularly every year. See FACTORY, FAIR, *&c.*

STAR, *ſtella*, in aſtronomy, a general name for all the heavenly bodies, which,

like ſo many brilliant ſtuds, are diſperſed throughout the whole heavens.

The ſtars are diſtinguiſhed, from the phænomena of their motion, *&c.* into fixed, and erratic or wandering ſtars: theſe laſt are again diſtinguiſhed into the greater luminaries, *viz.* the ſun and moon; the planets, or wandering ſtars, properly ſo called; and the comets; each whereof has been fully conſidered and explained under their reſpective articles SUN, MOON, PLANET, and COMET.

As to the fixed ſtars, or ſimply ſtars, they are ſo called becauſe they ſeem to be fixed, or perfectly at reſt, and conſequently appear always at the ſame diſtance from each other.

Diſtribution and number of the fixed STARS.

An obſerver will firſt divide theſe ſtars into ſeveral claſſes, according to the ſplendor of their light; the brighteſt he will call ſtars of the firſt magnitude; thoſe of the next inferior light, he will call ſtars of the ſecond magnitude; and ſo in order to thoſe which can barely be ſeen by the naked eye, which are called ſtars of the ſixth magnitude: and thoſe which cannot be ſeen but by the help of magnifying glaſſes, are of the ſeventh, eighth, *&c.* magnitudes. Afterwards, to avoid confuſion, and to be able to point out any one ſtar, without being obliged to give a particular name to each, he will divide them into ſeparate parcels, of which he will make a particular plan; and to each of theſe conſtellations, or parcels of ſtars, he will aſſign a figure at pleaſure, as that of a ram, a bull, a dragon, a Hercules, *&c.* but ſo that all the ſtars in each of the parcels, drawn in the plan, may be encloſed in the deſigned figures, and correſpond to the different parts from whence they take their name: for example, having drawn the figure of a bull about a parcel, or conſtellation, of ſtars, that ſtar which falls in the eye, will be called the ſtar in the bull's eye, or ſimply, the bull's eye; another, which reſpects the tip of one horn, will be named the bull's horn; and ſo of others. A parcel of ſtars thus contained in any aſſigned figure, is called a conſtellation. See CONSTELLATION.

By this means, notwithſtanding the ſeeming impoſſibility of numbering the fixed ſtars, their relative ſituations one to another have been ſo carefully obſerved by aſtronomers, that they have not only been able to number them, but even to diſtinguiſh the place of each ſtar in the heavens, and that with greater accuracy than any geographer could ever point out the ſituations of the ſeveral cities or towns upon the ſurface of the earth; and not only the places of thoſe few, if they may be ſo called, which are to be ſeen with the naked eye, have been pointed out and regiſtered by them, but even of thoſe which are diſcovered only by the teleſcope. The moſt antient obſervations of the ſtars, which have reached theſe times, were made by Timocharis and Ariſtillus, about 300 years before Chriſt. The next after them, who made a catalogue of the ſtars viſible to the naked eye, and regiſtered their places, was Hipparchus of Rhodes; he flouriſhed about 120 years before Chriſt, and numbered 1022 ſtars. After him, Ptolemy enlarged his catalogue to 1026: Ulug Beigh, the grand-father of Tamerlane the great, about the year 1437, conſtructed a new catalogue, more exact than that of Ptolemy, containing 1017 ſtars: Tycho, in the year 1600, determined the places of 777 fixed ſtars, and reduced them to a catalogue: Kepler's catalogue contained 1163 ſtars; and that of the prince of Heſſe, 400: Ricciolus enlarged Kepler's catalogue to 1468; and John Bayer, a German, had deſcribed the places of 1725 ſtars: after this, about 1670, Hevelius of Dantzick, compoſed a catalogue of 1888 fixed ſtars: Dr. Halley alſo undertook a voyage to the iſland of St. Helena, in order to take the poſition of the ſtars within the antartic circle, of which he publiſhed a catalogue, containing 373 ſtars: but the largeſt and moſt complete catalogue ever yet publiſhed, is that of our accurate aſtronomer Mr. Flamſteed, in his Celeſtial Hiſtory, which contains near 3000 ſtars; all whoſe places are more exactly determined in the heavens, than the poſition of cities and other places on the earth.

We ought not, however, to imagine, that all the fixed ſtars are thus numbered, and reduced to their reſpective places in the heavens; ſince their number continually increaſes, according to the goodneſs of the teleſcope, appearing millions beyond millions, till, by their immenſe diſtance, they evade the ſight, even tho' aſſiſted by the beſt inſtruments. The teleſcopical ſtars with which Mr. Flamſteed has enriched his catalogue, are only the more remarkable ones, whoſe longitudes and latitudes, or ſituations in the heavens, it was thought worth while to regiſter and put down. Dr. Hook, with

a teleſcope of twelve feet, ſaw 78 ſtars among the pleiades; and with a longer teleſcope, ſtill more: and, in the ſingle conſtellation of orion, which, in Mr. Flamſteed's catalogue, has but 80 ſtars, there have been ſeen 2000. We may, therefore, venture to pronounce the number of fixed ſtars, including the teleſcopic ones as well as thoſe viſible to the naked eye, to be infinitely great, far beyond what it is poſſible for the beſt aſtronomers to calculate, much leſs to reduce to order. But though the ſtars are certainly innumerable, yet thoſe viſible to the naked eye, in one hemiſphere, ſeldom exceed a thouſand; which, perhaps, may appear ſtrange, ſince, at firſt ſight, their number ſeems immenſely great; but this is only a deception of ſight, ariſing from a confuſed and tranſient view; for let a perſon ſingle out a ſmall portion of the heavens, and after ſome attention to the ſituation of the more remarkable ſtars therein, begin to count, he will ſoon be ſurprized to find how few there are therein. However, even the number of ſtars viſible to the naked eye, ſmall as it is in compariſon with that of the teleſcopic ones, is far from being conſtant; ſince, beſides that the different ſtates of the atmoſphere renders many of the leſſer ſtars inviſible, ſome ſtars have been obſerved to appear and diſappear by turns; particularly one in the chair Caſſiopeia, in the year 1572, which, for ſome time, outſhone the biggeſt of the fixed ſtars, and in ſixteen months time, by degrees, vaniſhed quite away, and was never ſeen ſince: in the year 1640, the ſcholars of Kepler ſaw a ſtar in the right leg of ſerpentarius, which likewiſe gradually diſappeared: Fabricius, in the year 1596, gives the firſt account of the ſtella mira, or wonderful ſtar, in the neck of the whale; which has been ſince found to appear and diſappear periodically, its period being ſeven revolutions in ſix years, but is never quite extinguiſhed. Several other new ſtars have been obſerved: as one by Hevelius, in 1670; and another by Mr. Kirch, in 1689. Theſe new ſtars are generally obſerved in the galaxy, or milky way. See GALAXY.

As to the cauſes of this appearing and diſappearing of the fixed ſtars, ſir Iſaac Newton conjectures, that as it is poſſible our ſun may ſometimes receive an addition of fuel by the falling of a comet into it; ſo the ſudden appearance of ſome ſtars, which formerly were not viſible to us, may be owing to the falling of a comet upon them, and occaſioning an uncommon blaze and ſplendor for ſome time: but that ſuch as appear and diſappear periodically, and increaſe by very ſlow degrees, ſeldom exceeding the ſtars of the third magnitude, may be ſuch as having large portions of their ſurfaces obſcured by ſpots, may, by revolving round their axes, like the ſun, expoſe their lighter and darker parts to us ſucceſſively.

Nature and diſtance of the fixed STARS.

From the ſimilitude there appears to be between them and the ſun, it is generally ſuppoſed by philoſophers, that they are not placed in the heavens by way of ornament only, or to ſupply us with a faint light in the abſence of the moon; but that each of them is placed in the midſt of a ſyſtem of planetary worlds, and that it directs their motions, and ſupplies them with light and heat, in the ſame manner that the ſun does the ſeveral bodies of which our ſolar ſyſtem is compoſed; in ſhort, that they are ſo many ſuns, which no doubt have planets moving regularly round them, though inviſible to us. That this is not mere hypotheſis, will appear from the following arguments, drawn from the analogy they bear to our ſun the ſun ſhines by its own native light, and ſo do the fixed ſtars: the ſun, at the diſtance of the fix-ſtars, would appear no larger than a ſtar; none of our planets, at that diſtance, could be ſeen at all: is it not probable, therefore, that each of the fixed ſtars is a fixed ſun, ſurrounded by a ſyſtem of planets and comets, which may be again furniſhed with different numbers of ſatellites, or moons, though inviſible to us? Beſides, as the number of ſtars is immenſely great, diſperſed through ſpaces of the univerſe, far beyond the reach of the beſt teleſcopes, and as God has made nothing in vain, it ſeems highly probable that they ſeverally ſerve the purpoſes of light and heat for the planets of their ſyſtems; ſince nothing can be more abſurd than to pretend that myriads of unſeen ſtars were made to twinkle in the unknown regions of the univerſe.

That the fixed ſtars ſhine by their own light, is thus proved: when viewed thro' a teleſcope, they appear only as mere lucid points, deſtitute of all ſenſible magnitude, and conſequently muſt be at a vaſt diſtance; becauſe the ſatellites of jupiter and ſaturn, when viewed through a teleſcope, appear of very diſtinguiſhable magnitudes,

magnitudes, and yet are invisible to the naked eye. Since, then, the fixed ſtars are at ſuch a vaſt diſtance, that the beſt teleſcope has no power to magnify them, and nevertheleſs ſhine with a very bright and ſparkling light, it is inferred that they muſt ſhine with their own proper and unborrowed light; becauſe, if their light was only borrowed, they would, like the ſatellites already mentioned, be inviſible to the naked eye.

The celebrated Huygens found the brighteſt and largeſt, and conſequently the neareſt of the fixed ſtars, *viz.* ſirius, or the dog-ſtar, to be in appearance 27664 times leſs than the ſun; and ſince the diſtances of objects are greater as their apparent magnitudes are leſſer, the dog-ſtar muſt be diſtant from our earth 2000000000000, or above two millions of millions of engliſh miles; which is ſo very great, that a cannon-ball continuing in the ſame velocity it acquires when immediately diſcharged at the mouth of the cannon, would ſpend almoſt ſeven hundred thouſand years in paſſing thro' it: and it is very probable, that the fixed ſtars are equally diſtant from each other, as the neareſt of them is from our ſun; ſince, the better the teleſcopes we make uſe of, the more ſtars are ſeen. Hence it is very natural to conclude, that all the fixed ſtars are not placed at equal diſtances from us: but that they are every where interſperſed, at great diſtances beyond one another, throughout the univerſe; and that, probably, the different appearances which they make, in point of ſplendor and magnitude, may be rather owing to their various diſtances from us, than to any real difference in their magnitudes.

From what has been ſaid, concerning the number, nature, and diſtance of the fixed ſtars, the hypotheſis of a plurality of worlds, wherein each fixed ſtar ſerves as a ſun to a ſyſtem of planets, ſeems rational, worthy a philoſopher, and greatly diſplays the wiſdom, and redounds to the glory, of the great creator and governor of the univerſe.

Apparent motions of the fixed STARS. Since the fixed ſtars remain immoveable, whatever is ſaid of their motions, muſt be underſtood of their apparent motions only; and of theſe aſtronomers reckon four kinds.

I. The firſt, and indeed the moſt obvious, apparent motion of the ſtars, is that from eaſt to weſt; which, being entirely owing to the diurnal rotation of the earth round its axis, has been already explained under the articles EARTH and DIURNAL.

II. The ſecond apparent motion of the fixed ſtars, ariſing from the preceſſion of the equinoxes, is very ſmall, not exceeding 50″ in a year, or 1° in 70 years; and, therefore, to complete one revolution of a circle, it requires no leſs than 25920 years, after which period the ſtars all return to their former places: this motion has alſo been accounted for, under PRECESSION and PLATONIC YEAR.

III. The third apparent motion of the ſtars, is owing to what is called the aberration of light; the diſcovery of which we owe to our excellent aſtronomer Dr. Bradley, who, being deſirous to diſcover the parallax of the earth's annual orbit, cauſed an inſtrument to be made by the late accurate Mr. Graham; and found, by many obſervations, that the bright ſtar, γ, in the head of the conſtellation draco, appeared 39″ more northerly in September than in March; juſt the reverſe of what it ought to appear, by the annual parallax of the ſtars. This unexpected phænomenon perplexed the Doctor and Mr. Molyneux very much; and Mr. Molyneux died before the true cauſe of it was diſcovered. Afterwards, Dr. Bradley, with another inſtrument, more exact, and accurately adapted to this purpoſe, obſerved the ſame appearances, not only in that, but many other ſtars; and being fully ſatisfied, by many repeated trials; that the phænomenon was neither owing to any error in the inſtrument nor obſervation, applied himſelf to conſider what might be the true cauſe of it; and after many reflections and hypotheſes, which he ſtill found inſufficient, he at laſt diſcovered that it was really owing to the progreſſive motion of light, and the ſenſible proportion which the velocity thereof bore to the velocity of the annual motion of the earth.

This important diſcovery we ſhall now proceed to explain; and firſt, it is a known fact, by the obſervation of jupiter's ſatellites, that the light whereby objects become viſible to us, employs a ſenſible time in coming from the object to the eye, when at a great diſtance from each other: this we have proved under the article LIGHT; where it is ſhewn, that a ray is about 8′ in coming from the ſun to the earth.

It is alſo certain, that the viſibility of objects

Fig. 2. SURMOUNTED.

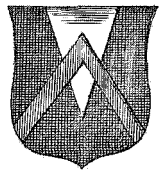


Fig. 1. Aberration of the STARS.

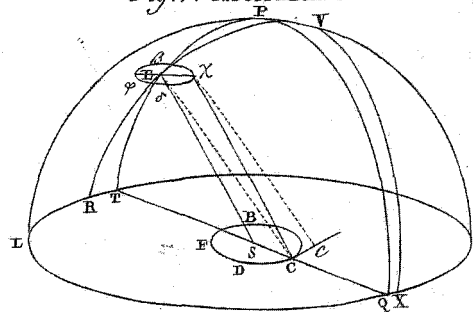


Fig. 3. STAR-FISH.

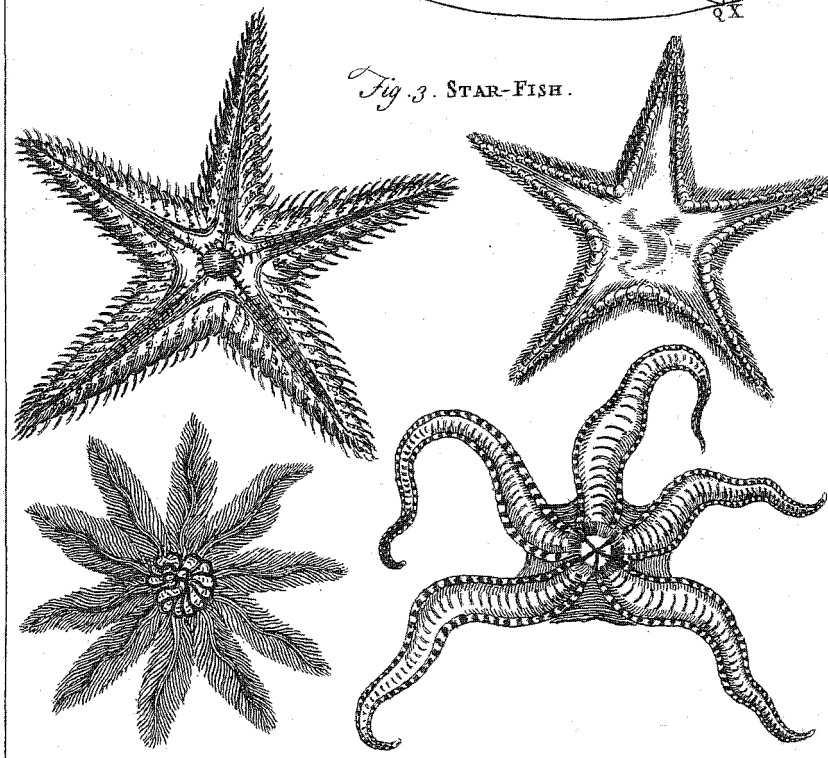


Fig. 4. STAR-STONES.

T. Jefferys sculp.

objects depends on the impreſſion made on the eye by the luminous rays they tranſmit; alſo the figure and poſition of objects are judged of according to this impreſſion, and therefore thought to be in the right line in whoſe direction they fall upon the eye. Hence, if the rays of light tranſmitted from objects arrive at the eye after having been reflected, refracted, or, by any phyſical accident, turned from their firſt courſe, the objects are however, judged to be in the direction of thoſe rays which enter the eye, and not in that of the rays immediately iſſuing from the object.

Now if the earth had no annual motion, a ray of light paſſing from a ſtar with any finite velocity, and arriving at the eye without being turned off by any phyſical cauſe, would ſhew the ſtar in its true ſituation, whatſoever time that ray might employ in coming from the ſtar to the eye: and the ſame would happen though the earth was moveable, provided the velocity of light was infinite; for then the earth's motion would be inconſiderable, when compared with a velocity infinitely great. But when the velocity of light has a finite proportion to that of the earth, the impreſſion of the ray on the eye is neither in the direction of the ray firſt tranſmitted, nor in that of the earth; but, like a body urged by two forces in different directions, the impreſſion is made in the diagonal of a parallelogram, formed by the directions of the ray, and a tangent to the earth's orbit at the point where the earth is when the ray falls on it, becauſe the ſides of this parallelogram are proportional to the velocities or ſpaces run through by the earth and ray, in the ſame time. So that the ſtar's apparent place will be at the end of that diagonal, which falls on one ſide of the ſtar's true place.

For example, let T L Q I (plate CCLX. fig. 1.) be an indefinitely great circle, repreſenting the ecliptic, with the ſun at its center S; P its pole, C B F D the earth's orbit, Q P E T a circle of latitude paſſing through any ſtar E, determining the longitude in T and latitude in T E. Let T Q be the interſection of the plane of this circle of latitude, with the plane of the ecliptic; and let the earth's place be firſt in C, when the ſtar is in conjunction with the ſun: then having joined C E, and drawn the tangent C c, which is perpendicular to the plane of the circle of latitude T P Q; C E is to C c, as the velocity of the ray of light is to the velocity of the earth in its orbit. Now it being known, that light is a little more than 8′ of time in paſſing from the ſun to the earth; alſo that the earth deſcribes in its orbit an arc of 20″ in that time, we have R: tang. 20″ :: C E = 8′ 13″: C c. Wherefore C c being thus determined, and the parallelogram E C c χ conſtructed, the point is the place in the heavens where the impreſſion of the light will occaſion the ſtar to appear; and the celeſtial arc, E χ, is called the ſtar's aberration.

From a like conſtruction made for every point of the earth's orbit, it follows, 1. That, ſuppoſing this orbit to be circular, and the velocities of light and the earth uniform, then all the apparent places of the ſame ſtar muſt be in a circle, with the ſtar's true place at its center, and whoſe plane is parallel to the ecliptic; conſequently, the projection of this circle in the heavens is an ellipſis, whoſe greater axis is parallel to the plane of the ecliptic, its leſſer axis perpendicular to that plane, and are in proportion as the radius to the ſine of the ſtar's latitude: and according to the niceſt obſervations, the greater axis of the ellipſis of aberration ſubtends in the heavens an arc of 40″ of a great circle. 2. The plane of a ſtar's parallelogram of aberration changes its ſituation every inſtant; being determined by the ſtar, and by the poſition of a tangent to every ſucceſſive place of the earth in its orbit: it muſt therefore make a revolution in a year; and becauſe of the almoſt infinite diſtance of the ſtars from the ſun and the earth, the earth's orbit may be taken only as the point S, and the plane of the angle of aberration may be ſuppoſed to turn in the right line E S, drawn from the ſtar to the ſun, in the ſame manner as the earth moves about the ſun. 3. The ſtar's apparent motion in this ellipſis, muſt differ from that in the epicycle; for when the plane of the parallelogram of aberration is become perpendicular to the plane T P Q of the circle of latitude, which happens in the ſyzygy, becauſe the tangent C c is then perpendicular to that plane, the angle of aberration is not in the plane T P Q, nor is there then any aberration in latitude but this angle is meaſured by the right line, E χ, parallel to the ecliptic, and perpendicular to the plane T P Q, being half the

greater

greater axis of the ellipſis; and is therefore the arc of a ſmall circle, parallel to the ecliptic, and paſſing through the ſtar's true place; the whole aberration being then in longitude, and at its greateſt. But when the plane of the angle of aberration co-incides with the plane T P Q, which happens when the earth has run through 90° from the ſyzygy, and conſequently where the ſtar is in quadrature with the ſun, the angle of aberration is wholly in latitude; and the ſtar being at the extremity of the leſſer axis of its ellipſe, the aberration in latitude is there greateſt, and nothing in longitude. In other poſitions of the plane of this angle, the aberration is divided partly in longitude, and partly in latitude, much like a force oblique to a plane; all which is juſt the reverſe of what it ſhould be, by the parallax of the annual orbit; ſince, according to it, the parallax in longitude is greateſt in the quadratures, and nothing in the ſyzygies; and the parallax in latitude is greateſt in the ſyzygies, and nothing in the quadratures. Moreover, if a circle of declination, R V X, be conceived to paſs through the ſtar E, conſequently croſſing its ellipſis of aberration by paſſing through the center; it is evident, that, when a ſtar appears at the points where that circle interſects the ellipſis, it will appear to have no aberration in right aſcenſion, becauſe its true and apparent place will be in the ſame circle of declination and when the ſtar is in the points where its ellipſis is cut by a diameter perpendicular to the circle R V X, it will have no aberration in declination, becauſe its true and apparent place will be in the ſame parallel to the equator. But all circles of declination being oblique to the ecliptic, except the ſolſtitial colure, the ſtar does not paſs from the term of no aberration in right aſcenſion, to that of no aberration in declination, in the time the earth takes to deſcribe 90° of its orbit; conſequently, when the aberration is greateſt in right aſcenſion, it is not abſolutely nothing in declination, and reciprocally.

Laſtly, to calculate the effect of the aberration of light on the planets, ſay; as the horary motion of the ſun multiplied by the radius of the annual orbit of the earth, is to the diſtance of the earth from the planet multiplied by 20″; ſo is the horary motion of the planet, in longitude, in latitude, in right aſcenſion, or in declination, to a quantity whereby the aberration of light has diminiſhed this longitude, this latitude, this right aſcenſion, or this declination. The demonſtration of this analogy may be found in the Memoirs of the Academy of Sciences at Paris, for the year 1746; and thoſe who deſire farther information on this ſubject, may conſult the ſaid Memoirs for 1737, the Philoſ. Tranſ. n° 485, and La Caille's Elem. Aſtron. §. 177, ſeq.

IV. The fourth apparent motion of the fixed ſtars is that ariſing from the nutation of the earth's axis; a diſcovery we alſo owe to doctor Bradley, who obſerved a greater declination in ſome of the fixed ſtars, lying nearly oppoſite in right aſcenſion, than the preceſſion of the equinoctial points would have occaſioned, and ſuch as a nutation or libratory motion of the earth's axis would effect. The quantity of this nutation, as collected from the doctor's obſervations, is 18″; which is equal to the diameter of the little circle, wherein the pole of the equator moves: but for the application of this theory to the practice of aſtronomy, in ſolving the various phænomena of the fixed ſtars, we muſt refer to the above-mentioned books; and ſhall only obſerve, that the corrections ariſing from the aberrations of light, as well as from the nutation of the earth's axis, muſt not be neglected in aſtronomical obſervations, ſince ſuch neglects may produce errors of near a minute in the polar diſtances of ſome ſtars. As to the cauſes of the nutation of the earth's axis, the doctor thinks ſome part of it at leaſt, if not the whole, is owing to the moon's action upon the equatorial parts of the earth; which, he conceived, might cauſe a libratory motion of the earth's axis. But as he was unable to judge, from only nine years obſervation, whether the axis would entirely recover the ſame poſition that it had in the year 1727, he found it neceſſary to continue his obſervations through a whole period of the moon's nodes; at the end of which he had the ſatisfaction to ſee, that the ſtars returned into the ſame poſitions again, as if there had been no alteration at all in the inclination of the earth's axis: which fully convinced him that he had gueſſed rightly as to the cauſe of the phænomenon. This circumſtance proves likewiſe,

likewiſe, that if there be a gradual diminution of the obliquity of the ecliptic, it does not ariſe only from an alteration in the poſition of the earth's axis, but rather from ſome change in the plane of the ecliptic itſelf: becauſe the ſtars, at the end of the period of the moon's nodes, appeared in the ſame places, with reſpect to the equator, as they ought to have done, if the earth's axis had retained the ſame inclination to an invariable plane.

Falling STARS, *ſtellæ cadentes*, in meteorology, fiery meteors, which dart thro' the ſky, in form of a ſtar; being occaſioned by a nitro-ſulphureous matter, the common cauſe of all ſuch meteors. See the article AURORA BOREALIS.

STAR, in heraldry, a charge frequently borne on the ſhield, and the honourable ordinaries, in figure of a ſtar; which differs only from the mullet, in not being pierced as this laſt is. See MULLET.

STAR is alſo a badge of honour, worn by the knights of the garter, bath, and thiſtle. See the article GARTER.

STAR, in pyrotechny, a compoſition of combuſtible matters, which, being thrown aloft in the air, exhibits the appearance of a real ſtar.

Stars are chiefly uſed as appendages to rockets, a number of them being uſually incloſed in a conical cap or cover, at the head of the rocket, and carried up with it to its utmoſt altitude, where the ſtars, taking fire, are ſpread around, and exhibit an agreeable ſpectacle. See the article ROCKET.

To make ſtars, mix three pounds of ſaltpetre, eleven ounces of ſulphur, one of antimony, and three of gun-powder duſt: or twelve ounces of ſulphur, ſix of ſaltpetre, five and a half of gun-powder duſt, four ounces of olibanum, one of maſtic, camphire, ſublimate of mercury, and half a one of antimony and orpiment. Moiſten the maſs with gum water, and make it into little balls of the ſize of a cheſnut, which dry either in the ſun or the oven. Theſe, ſet on fire in the air, will repreſent ſtars.

STAR-APPLE, *chryſophyllum*, in botany. See the article CHRYSOPHYLLUM.

STAR *of Bethlehem, ornithogalum*, in botany. See the article ORNITHOGALUM.

STAR-BOARD, in the ſea-language, denotes the right-hand ſide of a ſhip: thus they ſay, ſtar-board the helm, or helm a ſtar-board, when he that conds would have the men at the helm, or ſteering-wheel, put the helm to the right-ſide of the ſhip.

STAR-CHAMBER, a chamber at Weſtminſter, ſo called from having its roof painted with gilt ſtars, wherein the chancellor, aſſiſted by others, appointed for that purpoſe, formerly had authority to puniſh routs, riots, and other miſdemeanors, that were not by the common law provided againſt. See CHAMBER.

STAR-FISH, *aſterias*, or *ſtella marina*, in zoology, a genus of naked inſects, in the form of a radiated ſtar: the mouth is ſituated in the center, on the under part; and the anus in the center, on the upper part: the tentacula are extremely numerous, and in a manner cover, either the whole upper ſurface of the body, or the extremities of the ramifications.

The ſpecies of this genus, being very numerous, are diſtinguiſhed according to the number of their rays; they are alſo of different ſizes; the largeſt, or great magellanic ſtar-fiſh, forming a circle of three feet in diameter, when its rays are fully extended, others not exceeding an inch in diameter. See plate CCLX. fig. 3. where four of the leſſer ones are repreſented.

STAR-FORT, or REDOUBT, in fortification. See the articles FORT and REDOUBT.

STAR-GAZER, in ichthyology, the engliſh name of the uranoſcopus. See the article URANOSCOPUS.

STAR-SHOT, a gelatinous ſubſtance frequently found in fields, and ſuppoſed by the vulgar, to have been produced from the meteor, called a falling ſtar: but, in reality, is the half digeſted food of herons, ſea-mews, and the like birds; for theſe birds, when ſhot, have been found when dying, to diſgorge a ſubſtance of the ſame kind.

STAR-STONE, *aſteria*, in natural hiſtory, a name given to certain extraneous foſſile ſtones, in form of ſhort, and commonly ſomewhat crooked, columns, compoſed of ſeveral joints; each reſembling the figure of a radiated ſtar, with a greater or ſmaller number of rays in the different ſpecies: they are uſually found of about an inch in length, and of the thickneſs of a gooſe-quill. Some of them have five angles, or rays, and others only four, and in ſome the angles are equi-diſtant, while in others they are irregularly ſo; in ſome alſo they are ſhort and blunt, while in others they are long, narrow, and pointed; and ſome have

their angles ſo very ſhort and obtuſe, that at firſt ſight they might be taken for entrochoaſteriæ. The ſeveral joints in the ſame ſpecimen are uſually all of the ſame thickneſs; this however is not always theſe caſe, but in ſome they are larger at one end, and in others at the middle, than in any other part of the body; and ſome ſpecies have one of the rays bifid, ſo as to emulate the appearance of a ſix-rayed kind. See plate CCLX. fig. 4. where ſeveral ſorts of them are repreſented.

STAR-THISTLE, the engliſh name of a ſpecies of centauria, called by ſome calcitrapa. See CENTAURIA.

STAR-WORT, *after*, in botany. See ASTER.

STARCH, a fecula, or ſediment, found at the bottom of veſſels wherein wheat has been ſteeped in water, of which fecula, after ſeparating the bran from it, by paſſing it through ſieves, they form a kind of loaves, which being dried in the ſun or an oven, is afterwards cut into little pieces, and ſo ſold. The beſt ſtarch is white, ſoft, and friable, and eaſily broken into powder. Such as require fine ſtarch do not content themſelves, like the ſtarch-men, with refuſe wheat, but uſe the fineſt grain. The proceſs is as follows: The grain being well cleaned is put to ferment in veſſels full of water, which they expoſe to the ſun while in its greateſt heat, changing the water twice a day, for the ſpace of eight or twelve days, according to the ſeaſon. When the grain burſts eaſily under the finger, they judge it ſufficiently fermented. The fermentation perfected, and the grain thus ſoftened, it is put, handful by handful, into a canvas-bag, to ſeparate the flour from the huſks, which is done by rubbing and beating it on a plank laid acroſs the mouth of an empty veſſel that is to receive the flour.

As the veſſels are filled with this liquid flour, there is ſeen ſwiming at top rediſh water, which is to be carefully ſcummed off from time to time, and clean water is to be put in its place, which, after ſtirring the whole together, is alſo to be ſtrained through a cloth or ſieve, and what is left behind put into the veſſel with new water, and expoſed to the ſun for ſome time. As the ſediment thickens at the bottom, they drain off the water four or five times, by inclining the veſſel, but without paſſing it through the ſieve. What remains at bottom is the ſtarch, which they cut in pieces to get out, and leave it to dry in the ſun. When dry it is laid up for uſe.

To uſe ſtarch, they take as much as is needed, and ſteep it in water over night, changing the water four or five times. The ſtarchmen uſing the refuſe of wheat, only obſerve a part of theſe things in their proceſs, but their ſtarch falls far ſhort of this. Starch is uſed along with ſmalt, or blue ſtone, to ſtiffen and clear linnen; the powder thereof is alſo uſed to whiten and powder the hair. It is alſo uſed by the dyers to diſpoſe their ſtuffs to take colours the better.

Starch, the hundred weight, pays, on importation, three pounds, fifteen ſhillings, and four pence; and foreign ſtarch draws back nothing upon exportation. By the 23d. Geo. II. Starch may not be imported in any package that ſhall not contain two hundred and twenty-four pounds of neat ſtarch, at the leaſt, under penalty of forfeiting the goods, and the maſter, or other perſon, taking charge of the veſſel, to forfeit fifty pounds.

STARGARD, a town of Germany, in the circle of upper-Saxony, and dutchy of Pomerania, ſituated twenty miles eaſt of Stetin.

STARIA, a city of Ruſſia, in the province of great Novogorod, ſituated at the ſouth end of the Ilmen-lake: eaſt long. 34° 20′, north lat. 58°.

STARLING, *ſturnus*, in ornithology, a diſtinct genus of birds of the order of the paſſeres, the characters of which are theſe: the beak is of a ſubulated figure, and depreſſed in an angulated manner, and obtuſe at the extremity; the tongue is marginated and acute.

Of this genus there is only one known ſpecies; *viz.* the common ſtarling, much about the ſize of the black-bird, only that it ſtands more erect, and the body is ſlenderer. Its general colour is black, variegated with grey ſpots, and the tips of the feathers of the neck and back are yellowiſh: the principal feathers of the wings and tail are brown, and have ſome yellow at their edges. The ſtarling is frequent with us, and may be taught to imitate the human voice. See plate CCLXII. fig. 1. where n° 1. repreſents the cock, and n° 2. the hen.

STARTING, in the manege. A horſe is ſaid to be ſtarting, ſkittiſh, or timorous, that takes every object he ſees to be

be otherwiſe than it is; whence he frequently ſtops, flies out, and ſtarts ſuddenly to one ſide, inſomuch that the rider cannot make him go forwards. This fault is more common to geldings than ſtone-horſes, and theſe are moſt ſubject to it who have bad eyes, as well as thoſe that have been kept long in a ſtable without airing: but theſe laſt are eaſily cured of it. You ſhould never beat a ſtarting horſe in his conſternation, but get him to advance gently, and by fair means, to the object that alarms him.

START-POINT, a cape, or promontory, of Devonſhire, in the Engliſh channel, twelve miles ſouth of Dartmouth.

STATE, or ESTATE, an empire, kingdom, province, or extent of country under the ſame government. See the article ESTATE.

STATEN-ISLAND, an iſland of the province of New-York, in north-America, ſituated near the mouth of Hudſon's river, in weſt long. 72° 31′, north lat. 41°.

STATERA-ROMANA, or STEEL-YARD, a name given to the roman ballance. See the article BALLANCE.

STATES, or ESTATES, a term applied to ſeveral orders or claſſes of people aſſembled to conſult of matters for the public good. See ESTATE.

Thus ſtates-general is the name of an aſſembly conſiſting of the deputies of the ſeven united provinces; theſe are uſually thirty in number, ſome provinces ſending two, others more, and whatever reſolution the ſtates-general take, muſt be confirmed by every province, and by every city and republic in that province, before it has the force of a law. The deputies of each province, of what number ſoever they be, have only one voice, and are eſteemed as but perſon, the votes being given by provinces. Each province preſides in the aſſembly in its turn, according to the order ſettled among them. Guelderland preſides firſt, then Holland, &c. See STADTHOLDER.

States of Holland are the deputies of eighteen cities, and one repreſentative of the nobility, conſtituting the ſtates of the province of Holland: the other provinces have likewiſe their ſtates, repreſenting their ſovereignty, deputies from which make what they call the ſtates-general. In an aſſembly of the ſtates of a particular province, one diſſenting voice prevents their coming to any reſolution.

STATHOLDER. See STADTHOLDER.

STATICE, THRIFT, or COMMON SEA-LAVENDAR, in botany, a genus of the *pentandria-pentagynia* claſs of plants, the corolla whereof is infundibuliform, conſiſting of five petals, narrow at bottom, and broad, patent, and obtuſe at the top: there is no pericarpium: the cup becomes conſtringed about the neck, and its limb is expanded: and in this ſtate it retains the ſeed, which is ſingle, very ſmall, and roundiſh.

STATICS, that branch of mathematics which conſiders the motion of bodies ariſing from gravity. See MOTION.

Statics then is the doctrine, or theory, of motion, conſidered merely as ariſing from the weight of bodies; in which ſenſe it is diſtinguiſhed from mechanics, which is the application of ſtatics to machines, engines, &c. though, it muſt be owned, that ſtatics and mechanics are frequently confounded. See the article MECHANICS.

For the laws and principles whereon the doctrine of ſtatics is founded, ſee the articles GRAVITY, GRAVITATION, DESCENT, &c.

STATICS, *ſtatici*, in medicine, a kind of epileptics, or perſons ſeized with an epileptic fit; during which they contemplate ſome ſtrong and lively idea, whereby they are diſtinguiſhed from cataleptics, or perſons ſeized with a catalepſy. See CATALEPSY and EPILEPSY.

STATION, in geometry, ſurveying, &c. a place pitched upon to make an obſervation, take an angle, or the like. See OBSERVATION, SURVEYING, &c.

STATION, in the church of Rome, denotes certain churches where indulgences are to be had on certain days: thus we find in their calendar, Monday in Rogation week, ſtation at S. Maria Maggiore's; Tueſday, ſtation at St. John Lateran's, and S. Maria Novella's; and Wedneſday, ſtation at St. Peter's: and after the ſame manner, at other ſeaſons of the year.

STATION is alſo uſed, in the ſame church, for the ceremony of the prieſt's, or canon's, going out of the choir to ſing an anthem before the crucifix, or the image of our lady.

STATIONARY, in aſtronomy, ſignifies the appearance of a planet, when it ſeems to remain immoveable on the ſame point of the zodiac for ſeveral days.

As the earth, whence we view the motions of the planets, is out of the center of their orbits, the planets appear to proceed irregularly; being ſometimes ſeen to go forwards, that is, from weſt to eaſt, which is called the direction; ſometimes to go backwards, or from eaſt to weſt, which is called the retrogradation.

Now between theſe two ſtates there muſt be an intermediate one, wherein the planet neither appears to go backwards nor forwards, but to ſtand ſtill, and keep the ſame place in her orbit; which is called her ſtation: and this will happen, when the line that joins the earth's and planet's center is conſtantly directed to the ſame point in the heavens; that is, when it keeps parallel to itſelf. For all right lines, drawn from any part of the earth's orbit, parallel to one another, do all point to the ſame ſtar; the diſtance of theſe lines being inſenſible, in compariſon of that of the fixed ſtars.

Saturn is ſeen ſtationary at the diſtance of ſomewhat more than a quadrant from the ſun; jupiter at the diſtance of fifty-two degrees; and mars at a much greater diſtance.

Saturn is ſtationary eight days, jupiter four, mars two, venus one and an half, and mercury an half, though the ſeveral ſtations are not always equal.

STATIONARY-DAYS, in church-hiſtory, an appellation given to the weekly faſt-days, *viz.* Wedneſdays and Fridays; otherwiſe called half-faſts, and faſts of the fourth and ſixth days of the week. See the article FAST.

Theſe faſts are certainly as antient as Clemens Alexandrinus and Tertullian, who both mention them; and the reaſon of their inſtitution is, becauſe on the fourth day of the week the Jews took council to put our Saviour to death, which was actually accompliſhed on the ſixth: however, being in continual uſe throughout the year, they were not kept with ſuch rigour and ſtrictneſs as Lent. See the article LENT.

STATIONARY FEVER, a peculiar kind of fever, adapted, and owing, to ſome general conſtitution of the air and ſeaſons. Sydenham obſerves, that there are certain general conſtitutions of years, which owe their origin neither to heat, cold, dryneſs, nor moiſture, but rather depend upon a certain ſecret and inexplicable alteration in the bowels of the earth, whence the air becomes impregnated with ſuch kinds of effluvia as ſubject the human body to peculiar diſtempers, ſo long as that kind of conſtitution prevails, which after a certain courſe of years declines, and gives way to another. Each of theſe general conſtitutions is attended with its own proper and peculiar kind of fever, which never appears in any other; and this is thence called a ſtationary-fever. See FEVER.

STATIVA, among the Romans, a ſtanding-camp kept for the defence of the frontiers of the empire. Theſe camps gave riſe to a great many towns, which took their names from the legion ſtationed there.

STATUARY, *ſtatuaria*, a branch of ſculpture, employed in the making of ſtatues. See SCULPTURE and the next article.

Statuary is one of thoſe arts wherein the antients ſurpaſſed the moderns; and indeed it was much more popular, and more cultivated among the former than the latter. It is diſputed between ſtatuary and painting, which of the two is the moſt difficult and the moſt artful. Statuary is alſo uſed for the artificer who makes ſtatues. Phidias was the greateſt ſtatuary among the antients, and Michael Angelo among the moderns.

STATUE, *ſtatua*, is defined to be a piece of ſculpture in full relievo, repreſenting a human figure. Daviler more ſcientifically defines ſtatue a repreſentation, in high relievo and inſulate, of ſome perſon diſtinguiſhed by his birth, merit, or great actions, placed as an ornament in a fine building, or expoſed in a public place, to preſerve the memory of his worth. In ſtrictneſs, the term ſtatue is only applied to figures on foot, the word being formed from *ſtatura*, the ſize of the body.

Statues are formed with the chiſſel of ſeveral matters, as ſtone, marble, plaſter, *&c.* They are alſo caſt of various kinds of metal, particularly gold, ſilver, braſs, and lead. For the method of caſting ſtatues, ſee the article FOUNDERY *of ſtatues*.

Statues are uſually diſtinguiſhed into four general kinds: the firſt are thoſe leſs than the life, of which kind we have ſeveral ſtatues of great men, of kings, and of gods themſelves; the ſecond are thoſe equal to the life, in which manner it was that the antients, at the public expence, uſed to make ſtatues of perſons eminent

for

for virtue, learning, or the ſervices they had done: the third, thoſe that exceed the life, among which, thoſe which ſurpaſſed the life once and a half, were for kings and emperors, and thoſe double the life, for heroes: the fourth kind were thoſe that exceeded the life twice, thrice, and even more, and were called coloſſuſes. See COLOSSUS.

Every ſtatue, reſembling the perſon it is intended to repreſent, is called *ſtatua iconica*. Statues acquire various other denominations. 1. Thus allegorical ſtatue, is that which, under a human figure, or other ſymbol, repreſents ſomething of another kind, as a part of the earth, a ſeaſon, age, element, temperament, hour, *&c.* 2. Curule ſtatues, are thoſe which are repreſented in chariots drawn by bigæ, or quadrigæ, that is, by two, or four horſes; of which kind there were ſeveral in the circuſes, hippodromes, *&c.* or in cars, as we ſee ſome, with triumphal arches, on antique medals. 3. Equeſtrian ſtatue, that which repreſents ſome illuſtrious perſon on horſe-back, as that famous one of Marcus Aurelius, at Rome; that of king Charles the firſt, at Charing-Croſs; King George the ſecond, in Leiceſter-Square, *&c.* 4. Greek ſtatue, denotes a figure that is naked and antique; it being in this manner the Greeks repreſented their deities, athletæ of the olympic games, and heroes: the ſtatues of heroes were particularly called achillean ſtatues, by reaſon of the great number of figures of that prince in moſt of the cities of Greece. 5. Hydraulic ſtatue, is any figure placed as an ornament of a fountain or grotto, or that does the office of a jet d'eau, a cock, ſpout, or the like, by any of its parts, or by any attribute it holds; the like is to be underſtood of any animal ſerving for the ſame uſe. 6 Pedeſtrian ſtatue, a ſtatue ſtanding on foot; as that of king Charles the ſecond, in the Royal-Exchange; and of king James the ſecond, in the Privy Gardens. 7. Roman ſtatue, is an appellation given to ſuch as are cloathed, and which receive various names from their various dreſſes. Thoſe of emperors, with long gowns over their armour, were called *ſtatuæ paludatæ*: thoſe of captains and cavaliers, with coats of arms, *thoracatæ*: thoſe of ſoldiers, with cuiraſſes, *loricatæ*: thoſe of ſenators and augurs, *trabeatæ*: thoſe of magiſtrates, with long robes, *togatæ*: thoſe of the people, with a plain tunica, *tunicatæ*; and, laſtly, thoſe of women, with long trains, *ſtolatæ*.

The Romans had another diviſion of ſtatues into divine, which were thoſe conſecrated to the gods, as Jupiter, Mars Apollo, *&c.* Heroes, which were thoſe of the demi gods, as Hercules, *&c.* and Auguſti, which were thoſe of the emperors, as thoſe two of Cæſar and Auguſtus, under the portico of the capitol.

In repairing a ſtatue caſt in a mould, they touch it up with a chiſſel, graver, or other inſtrument, to finiſh the places which have not come well off: they alſo clear off the barb, and what is redundant in the joints and projectures.

STATURE, the ſize or height of a man.

STATUTE, *ſtatutum*, in its general ſenſe, ſignifies a law, ordinance, decree, *&c.* See LAW, *&c.*

Statute, in our laws and cuſtoms, more immediately ſignifies an act of parliament made by the three eſtates of the realm: and ſuch ſtatutes are either general, of which the courts at Weſtminſter muſt take notice, without pleading them; or they are ſpecial and private, which laſt muſt be pleaded. It is held, that a public ſtatute, made in affirmation of the common law, extends to all times after the making thereof, although it mentions only a remedy for the preſent: and where a thing is given or granted by ſtatute, all neceſſary incidents are at the ſame time granted with it. The moſt natural expoſition of a ſtatute is, to conſtrue one part by another of the ſame ſtatute, becauſe that beſt expreſſes the intent of the makers: alſo, ſtatutes, in general, ought to be expounded in ſuppreſſion of the miſchief, and for the advancement of the remedy deſigned by any ſtatute, yet ſo that no innocent perſon may ſuffer or receive any damage thereby. It is held, that ſtatutes will continue in force though the records of them are deſtroyed, *&c.* But if a ſtatute be againſt reaſon, or impoſſible to be performed, the ſame is void of courſe.

STATUTE is alſo uſed for a ſhort inſtrument in writing, termed ſtatute-merchant, or ſtatute-ſtaple, which are in the nature of bonds, and called by the name ſtatutes, on account of their being made purſuant to the forms preſcribed by certain ſtatutes, whereby it is directed, before what perſons, and how they are to be made. Statute-merchant is defined to be a bond acknowledged before one of the clerks of the ſtatutes-merchant of the city of London,

London, or two merchants aſſigned for that purpoſe, or before the mayor, or chief magiſtrate of other cities or corporations, or other ſufficient perſons, for that end appointed, ſealed with the ſeal of the debtor and the king, upon condition that if the obligor pay not the debt at the day, execution may be awarded againſt his body, lands, and goods; in which caſe the recogniſee, or obligee, ſhall hold the land to him, his heirs, and aſſigns, until ſuch time as the debt is levied; and a perſon who is in poſſeſſion of land, on ſuch a ſtatute, is called tenant, by ſtatute-merchant.

Statutes-ſtaple particularly concern merchants of the ſtaple, are of the ſame nature with ſtatutes-merchant, and are for debts acknowledged before the mayor of the ſtaple in our chief cities, *&c.* in the preſence of one or more of the conſtables of the ſtaple, by virtue of which the creditor, on non-payment of his money when due, has the ſame remedy againſt his debtor as is to be had upon a ſtatute-merchant. See STAPLE.

At firſt ſtatutes-merchant were contrived for the benefit of merchants only, to provide a ſpeedy remedy for recovering their debts; but now they are uſed by others, and are become one of the common ſecurities of the kingdom. And a ſtatute acknowledged on lands ſhall be ſatisfied before an obligation, the debt due whereon being but a choſe in action, and recoverable by law; as is a debt upon a ſtatute, or recogniſance, in which caſe execution may be taken out immediately without further ſuit; though ſtatutes-ſtaple, and likewiſe ſtatutes-merchant, are required to be entered within ſix months, or they ſhall not be good againſt purchaſers.

STATUTE-SESSIONS is taken for a meeting of conſtables and houſeholders in ſome hundreds, by cuſtom, for the debating of differences between maſters and ſervants, the rating of ſervants wages, and beſtowing perſons in ſervice, *&c.*

STATUTO-MERCATORIO, a writ which lies for the impriſoning of a debtor, on the forfeiture of his ſtatute-merchant-bond, until ſuch time as the debt be ſatisfied.

STATUTO-STAPULÆ, is a writ that lies for the taking of the body of a debtor on a ſtatute-ſtaple-bond, and for ſeizing the lands and goods of him that has forfeited ſuch bond.

STAVANGER, a port-town of Norway, in the province of Bergen, capital of the territory Stavanger, ſituated on a peninſula in the German-ocean: eaſt long. 6° 30′, north lat. 59° 30′.

STAVEREN, a port-town of the united Netherlands, in the province of weſt-Frieſland, ſituated on the Zuyder-ſea: eaſt long. 5° 12′, north lat. 53°.

STAVERS, or STAGGERS, among farriers, a giddineſs in a horſe's head, which ends in madneſs. This diſeaſe is frequently occaſioned by turning out a horſe to graſs too ſoon, before well cold, where, by hanging down his head to feed, bad vapours and humours are generated, which oppreſſing the brain, are the proximate cauſe of this diſeaſe. Sometimes it comes by over exerciſe in hot weather, which inflames the blood, *&c.* and ſometimes by noiſome ſmells in the ſtable, exceſſive eating, *&c.* The ſigns of it are dimneſs of ſight, reeling and ſtaggering, watery eyes, *&c.* At length, for perfect pain, he beats his head againſt the wall, thruſts it into the litter, riſes and lies down with fury, *&c.* For the cure of this diſtemper there are various preſcriptions, one of which is, firſt to bleed the horſe, then to diſſolve the quantity of a hazel-nut of ſweet butter in a ſaucer full of wine; then taking ſome lint, or fine flax, dip it in the mixture and ſtop his ears with it, and ſtitch them for twelve hours: ſome boil an ounce and a half of bitter-almonds, two drams of ox-gall, half a pennyworth of black hellebore made into powder, grains of caſtoreum, vinegar and varniſh, of each five drams; which they boil and ſtrain, and then put into his ears.

STAY, in the ſea-language, a big ſtrong rope faſtened to the top of one maſt, and to the foot of that next before it, towards the prow, ſerving to keep it firm, and prevent its falling aftwards or towards the poop. All maſts, top-maſts, and flag-ſtaves, have their ſtays, except the ſprit-ſail top-maſts. That of the main-maſt is called the main-ſtay. The main-maſt, fore-maſt, and thoſe belonging to them, have alſo back-ſtays to prevent their pitching forwards or over-board, as going on either ſide of her.

To ſtay a ſhip, or to bring her on the ſtays, is to manage her tackle and ſails ſo that ſhe cannot make any way forwards; which is done in order to her tacking about.

STAY, in the manege. To ſtay or ſuſtain the horſe, is to hold the bridle firm and high. We likewiſe ſtay or ſuſtain a horſe with the in-leg or the in heel, when he makes his croupe go before his ſhoulders upon volts. We ſtay a horſe again when we hinder him to traverſe, when we ride him equally, keeping him always ſubject, ſo that his croupe cannot ſlip out, and he can loſe neither his cadence nor his ground, but marks all his times equal

STEADY, a word of command, at ſea, for the man at the helm to keep the ſhip ſteady in her courſe, and not to make angles (or yaws, as they call them) in and out.

STEATOMA, a kind of encyſted tumour, conſiſting of a matter like ſuet or lard, ſoft, without pain, and without diſcolouring the ſkin. See TUMOUR.

STEEL, a kind of iron refined and purified by the fire with other ingredients. See the article IRON.

Steel, of all other metals, is that ſuſceptible of the greateſt degree of hardneſs when well tempered, whence its great uſe in the making of tools and inſtruments of all kinds. Mr. Cramer obſerves, that the difference between iron and ſteel is, that the latter being much harder will not yield to the hammer, but is brittle inſtead of being ductile, and reſiſts the file. Malleable iron grows rigid by being ſimply extinguiſhed in cold water, but it yet retains a conſiderable degree of ductility in the cold, and may be extended in all dimenſions with the hammer. Steel, however, if heated again, and cooled by ſlow degrees, may be filed and extended more or leſs by the hammer. But there are many degrees in the hardening of ſteel; for if it has been extremely red hot, and is then quenched in cold water in motion, it becomes greatly harder than if it had been but moderately red hot, and had been quenched in warm water. Steel is alſo of a darker colour than iron, and the ſurface of it, when broken, appears to conſiſt of ſmaller granulated, or even ſtriated, particles than the iron it was made of. Mr. Cramer further obſerves, that the method of making ſteel out of iron is either by cementation or by fuſion. That by cementation may be performed in the following manner: chooſe ſome bars of pure iron, not too thick, and quite free from heterogeneous matter, the flexibleneſs of it, both when hot and cold, being a very good ſign thereof: prepare a cement of charcoal-duſt, moderately pulverized, one part; and wood-aſhes, half a part: or of charcoal-duſt two parts, bones, horns, or hair of animals, burnt to a blackneſs, in a cloſe veſſel and in a gentle fire, and afterwards reduced to powder, one part; wood-aſhes, half a part: mix them together; prepare an earthen cylindrical veſſel, two or three inches higher than the bars are long; put into the bottom of this veſſel the cement, prepared as before directed, ſo that being gently preſſed down it may cover the bottom of the veſſel an inch and half deep; place then the bars perpendicularly, ſo that they may be every where about an inch from the ſides of the veſſel and from each other; fill the interſtices with the ſame cement, and cover alſo the bars with it, ſo that the veſſel may be quite full; next cover it with a tile, and ſtop the joints with thin lute: put this veſſel into a furnace, and keep it moderately but equally red hot, for ſix or ten hours together; when this is over, take the red hot bars out and dip them in cold water, they will then be brittle, and turned to ſteel. See CÆMENTATION.

The method of making ſteel by fuſion is as follows: take of iron-ore, or of unmalleable iron, of the firſt fuſion, divide it into ſmall parcels, and put them into a bed made of charcoal-duſt, in a ſmith's forge: let the quantity of iron be but ſmall for the experiment; put to it, as a defenſitive menſtruum, ſome of the vitreſcent ſcoriæ of ſand, or ſtones of the ſame nature; then put upon them a quantity of charcoal; light this, and admit only a gentle blaſt of the bellows, that the ſcoriæ and the metal may both melt regularly: when this has been ſome time kept in fuſion, take it out, and divide it into two parts, which make red hot, and hammer into long bars: finally, beat them red hot, and plunge them into cold water, and they will be found to be ſteel, ſo very hard as not to be fileable, and ſo brittle as to break aſunder when ſtruck with conſiderable force.

A bar of iron, when converted into ſteel, is not equally ſo converted in all its parts; the fire has always acted more ſtrongly upon its ſurface than on its central parts, and it is therefore more perfect ſteel there than in its inner parts; but a perfection in the operation is not neceſſary to the ſteel's being good and uſeful, for the whole

whole bar is often very good ſteel, as are alſo many bars made at the ſame time, yet all, perhaps, differently affected.

If the compoſition which is to convert the iron into ſteel be too ſtrong, or if the fire be too violent, or the matter continued too long in it, in all theſe caſes the ſteel will be over made. The way to meliorate ſuch ſteel as this, muſt be to diveſt it of part of its ſalts and its ſulphur, but particularly the laſt; and M. Reaumur found, that, burying the bars of ſuch ſteel in lime, or any other alkaline ſubſtance that would readily abſorb the ſulphurs, and placing it for a proper time in the fire, it would be in a manner decompoſed again, and come out a very good and perfect ſteel.

By this management ſteel may again be converted or reduced to its primitive iron, and a body of any middle degree between ſteel and iron may be produced by ſtopping the proceſs at different points of time, or continuing it till all the adventitious ſalts and ſulphurs are drawn off or abſorbed. See TEMPERING.

Annealing or nealing of ſteel, is by ſome uſed for the ſoftening it, in order to make it work eaſier, which is uſually done by giving it a blood-red heat in the fire, and then taking it out and letting it cool of itſelf: ſome have pretended to ſecrets in annealing, by which they could bring down iron or ſteel to the temper of lead: this was done by often heating the metal in melting lead, and letting it cool again out of the lead. But this method is found by Moxon to have no other effect than what is had from the former. Steel may, indeed, be made a little ſofter than in the common way, by covering it with coarſe powder of cow-horn or hoofs; thus incloſing it in a loam, heating the whole in a wood-fire till it be red hot, and then leaving the fire to go out of itſelf, and the ſteel to cool.

Steel manufactures, for every twenty ſhillings value, upon oath, pay, upon importation, 3 s. $10\frac{20}{100}$ d. and, on exportation, draw back, 3 s. $4\frac{50}{100}$ d. Steel manufactures, for every 112 lb. pay, on importation, 5 s. $1\frac{87\frac{1}{2}}{100}$ d. and, on exportation, draw back the ſame money. But if exported to the britiſh plantations, there is no drawback.

STEEL GLASSES, a name given by ſome authors to the metalline ſpheres uſed in optics. Theſe, according to Cardan, are made of three parts of braſs, one part of tin, and one of ſilver, with an eighteenth part of antimony; but moſt either totally leave out the ſilver, or add only a twenty-fourth part, to ſave the expence. There are many other methods directed by ſeveral authors, but moſt uſe arſenic and tartar mixed with the metals. Theſe are afterwards to be poliſhed with emery, rotten-ſtone, putty, and the like.

STEELYARD, *ſtatera romana*. See the article BALLANCE.

STEENBERG, a town of dutch Brabant, ſituated on the confines of Zeland, twenty-five miles north of Antwerp.

STEENKIRK, a village of the auſtrian Netherlands, in the province of Hainault, ten miles north of Mons.

STEENWICK, a town of the united Netherlands, in the province of Overyſſel, ſituated near the confines of Frieſland, eighteen miles north of Zwoll.

STEEPLE, an appendage erected generally on the weſtern end of a church, to hold the bells. Steeples are denominated from their form, either ſpires or towers; the firſt are ſuch as aſcend continually diminiſhing either conically or pyramidally. The latter are mere parallelopipeds, and are covered a-top platform-like. See SPIRE and TOWER.

In each kind there is uſually a ſort of windows or apertures to let out the ſound, and ſo contrived at the ſame time, as to drive it down.

STEERAGE, on board a ſhip, that part of the ſhip next below the quarter-deck, before the bulk-head of the great cabbin, where the ſteerſman ſtands in moſt ſhips of war. See the next article.

STEERING, in navigation, the directing a veſſel from one place to another by means of the helm and rudder. He is held the beſt ſteerſman who cauſes the leaſt motion in putting the helm over to and again, and who beſt keeps the ſhip from making yaws, that is, from running in and out. There are three methods of ſteering, 1. By any mark on the land, ſo as to keep the ſhip even by it. 2. By the compaſs, which is by keeping the ſhip's head on ſuch a rhumb or point of the compaſs, as beſt leads to port. 3. To ſteer as one is bidden or conned, which, in a great ſhip, is the duty of him that is taking his turn at the helm. See the article COND.

For the theory and effect of ſteering, ſee NAVIGATION, SAILING, *&c.*

STEEVE,

STEEVE, on board a ſhip. The ſeamen ſay the bowſprit or the beak-head of a ſhip ſteeves, when it ſtands two upright, or not ſtraight enough forward.

STEGANOGRAPHY, the art of ſecret writing, or of writing in cyphers, known only to the perſons correſponding.

STEGEBURG, a port-town of Sweden, in the province of eaſt Gothland, ſituated on a bay of the Baltic: eaſt long. 16°, north lat. 58° 30'.

STEGNOTICS, in medicine, remedies proper to cloſe and ſtop the orifices of the veſſels or emunctuories when relaxed, ſtretched, lacerated, *&c.* ſuch as pomegranate-leaves and roſes, plantain-leaves, tormentil-roots, *&c.* Stegnotics are proper in the hæmorrhoids and other fluxes of the blood.

STELLA, a STAR. See the article STAR.

STELLARIA, in botany, the ſame with the coriſpermum. See CORISPERMUM.

STELLARIS, in botany, the ſame with the ornithogalum. See ORNITHOGALUM.

STELLATE, among botaniſts, expreſſes leaves which grow not leſs than ſix at a joint, and are arranged like the rays of a ſtar.

STELLIONATE, *ſtellionatus*, in the civil law, a kind of crime committed by a fraudulent bargain, where one of the parties ſells a thing for what it is not; as if I ſell an eſtate for my own which belongs to another, or convey a thing as free and clear which is already engaged to another, or put off copper for gold, *&c.*

STEM, in botany, that part of a plant ariſing out of the root, and which ſuſtains the leaves, flowers, fruits, *&c.* See the article STALK.

STEM *of a ſhip*, that main piece of timber which comes bending from the keel below, where it is ſcarfed, as they call it; that is, pieced in; and riſes compaſſing right before the forecaſtle. This ſtem it is, which guides the rake of the ſhip, and all the butt-ends of the planks are fixed into it. This, in the ſection of a firſt rate ſhip, is called the main ſtem. See the article SHIP.

Falſe ſtem, in a ſhip, is that fixed before the right one, where that is made too flat for the ſhip to keep the wind well; this will make her rid more way, and bear a better ſail.

STEMPLES, in mining, croſs-bars of wood in the ſhafts which are ſunk to mines. In many places the way is to ſink a perpendicular hole or ſhaft, the ſides of which they ſtrengthen from top to bottom with wood-work, to prevent the earth from falling in; the tranſverſe pieces of wood uſed for this purpoſe, they call ſtemples, and by means of theſe the miners, in ſome places, deſcend without uſing any rope, catching hold of theſe with their hands and feet.

STENAY, a town of the french Netherlands, in the province of Luxemburg, ſituated on the eaſt ſide of the river Maes, twelve miles weſt of Montmedy.

STENCH. See the article STINK.

STENDEL, a town of Germany, in the circle of Upper Saxony, and marquiſate of Brandenburg, ſituated thirty-ſix miles north of Magdeburg.

STENFORT, a town of Germany, in the circle of Weſtphalia, and county of Bentheim, ſituated eighteen miles north of Munſter.

STENONIAN DUCT, or *ductus ſalivus ſtenonius*, in anatomy, a name given from Steno, its diſcoverer, to one of the ſuperior ſalival ducts running from each of the parotids, about three fingers long, and of the thickneſs of a wheat-ſtraw, having a great number of roots. This duct paſſes over the maſſeter muſcle through the middle of the cheek, and there perforates the buccinator muſcle, and the membrane of the mouth near the ſecond or third of the ductus molares, and at this perforation it diſcharges a very large quantity of its proper fluid into the mouth. See SALIVAL, PAROTID, *&c.*

STENTOROPHONIC TUBE, a ſpeaking trumpet, thus called from Stentor, a perſon mentioned by Homer. See the article TRUMPET.

STEP. See PACE, STAIRCASE, *&c.*

STEP *of the maſt and capſtan*, in a ſhip, is that piece of timber whereon the maſts or capſtans do ſtand at bottom.

STEP *and leap*, in the manege, one of the ſeven airs or artificial motions of a horſe, conſiſting, as it were, of three airs, *viz.* the pace or ſtep, which is terra a terra; the raiſing, which is the curvet, and the whole finiſhed with a ſault or leap. The ſtep properly puts a horſe on the hand, and gives him a riſe to leap; like one that runs before he leaps, that he may go the higher or the farther. For leaps of all kinds, the rider is not to give any aids or helps with his legs, only to hold the horſe well up with the bridle-hand when he riſes before, that he may riſe the higher behind. When he begins to riſe behind, he is to put the bridle-hand

a little forwards to hold him before, and ſtay him there on the hand as if he hung in the air, timing the motion of the bridle-hand ſo, as to make him like a ball on the bound, which is the great ſecret in leaping.

STEPHEN, or *St.* STEPHEN'S DAY, a feſtival of the chriſtian church, obſerved on the 26th of December, in memory of the firſt martyr St. Stephen.

STEREOGRAPHIC PROJECTION, is the projection of the circles of the ſphere on the plane of ſome one great circle, the eye being placed in the pole of that circle. The method and practice of this projection in all the principal places, *viz.* on the planes of the meridian, equinoctial, and horizon, have already been given under the articles MAP and PROJECTION.

STEREOGRAPHY, the art of drawing the forms and figures of the ſolids upon a plane. See SOLID and PLANE.

STEREOMETRY, *στερεομετρια*, that part of geometry which teaches how to meaſure ſolid bodies, *i. e.* to find the ſolidity or ſolid content of bodies, as globes, cylinders, cubes, veſſels, ſhips, *&c.* See the articles GLOBE, CYLINDER, *&c.*

STEREOTOMY, the art or act of cutting ſolids, or making ſections thereof, as walls or other members in the profiles of architecture. See SECTION.

STERILITY, the quality of a thing that is barren, in oppoſition to fertility. See the article FERTILITY.

Nature has annexed ſterility to all monſtrous productions, that the creation might not degenerate. Hence the ſterility of mules, *&c.*

Women frequently become ſterile after a miſcarriage or a difficult labour, by reaſon the uterus or ſome other of the genital parts are injured thereby.

STERLING, a term frequent in britiſh commerce. A pound, ſhilling, or penny ſterling, ſignifies as much as a pound, ſhilling, or penny of lawful money of Great Britain, as ſettled by authority.

STERN *of a ſhip*, uſually denotes all the hindermoſt part of her, but properly it is only the outmoſt part abaft. See the articles SHIP, ABAFT, *&c.*

STERN-FAST, denotes ſome faſtenings of ropes, *&c.* behind the ſtern of a ſhip, to which a cable or hawſer may be brought or fixed, in order to hold her ſtern to a wharf, *&c.*

STERN-POST, a great timber let into the keel at the ſtern of a ſhip, ſomewhat flopping, into which are faſtened the afterplanks; and on this poſt, by its pintle and gudgeons, hangs the rudder.

STERN, among hunters, is the tail of a wolf or greyhound. See TAIL.

STERN-CHASE. See the article CHASE.

STERNBERG, a town of Germany, in the circle of Upper Saxony and marquiſate of Brandenburg, ſituated twenty-three miles north-eaſt of Frankfort upon the Oder.

STERNOHYOIDÆUS, in anatomy, a long, thin, flat muſcle, fixed by its lower extremity in the ſuperior and lateral part of the inner or poſterior ſide of the ſternum, in the poſterior part of the ſternal extremity of the clavicle, in the tranſverſe ligament which connects theſe two bones, and in the inner or backſide of the cartilage of the firſt rib: from hence it runs up to the foreſide of the aſpera arteria, joins its fellow by a membrane which forms a ſort of linea alba, and is inſerted laterally in the lower edge of the baſis of the os hyoides.

STERNUM, in anatomy, the breaſt-bone, being a cartilaginous ſort of bone which compoſes the forepart of the breaſt, and into which the ribs are fitted. See the article RIB.

In adults this bone is often ſingle, but ſometimes it has two, ſometimes three, pieces concurring to form it. Its ſubſtance is fungous and ſpungy; its upper part is called the manubrium or handle, and in this there is on each ſide a cavity for the articulation of the clavicles. In the middle it is narrow, and broad at the lower part. To this alſo there adheres a cartilage called from its figure cartilago enſiformis, or xiphoides. This is uſually ſingle; ſometimes it is bifurcated, and not unfrequently bony throughout; and on each ſide of the ſternum there are ſeven cavities for the articulation of the ſeven true ribs.

The uſes of the ſternum are, 1. To form the anterior part of the breaſt. 2. To ſupport the ribs and the clavicles. 3. To defend the parts contained in the cavity of the breaſt. 4. To ſerve for the inſertion of the mediaſtinum, and for the ſuſtaining the heart itſelf and ſeveral muſcles.

The ſternum is equally ſubject to depreſſions and fractures from falls or blows with the reſt of the bones. When either of theſe happen, the part is not only uneven and painful, but the ſubjacent arteries and veins are alſo contuſed or ruptured;

ruptured; whence ariſe pains in the breaſt, difficulty of breathing, violent coughs, ſpitting of blood, or elſe extravaſations of it in the præcordia, or between the duplicatures of the mediaſtinum, with many bad ſymptoms of the like nature. A fractured ſternum will therefore be very evident from theſe ſigns, and from its being moveable to the touch, eſpecially when one part grates againſt another. In order to ſet the fracture of this bone, if any part of it be diſplaced, Heiſter directs the patient to be laid on his back on a bed or table, putting a hard pillow, a large parcel of cloth rolled up, or ſome other ſuch body under his back, and preſſing down his ſhoulders, by which means the ſternum will be elevated and extended; and to facilitate the reduction, the ſurgeon muſt preſs the ſides of the breaſt together, and ſtroke them pretty ſtrongly; but when this method is impracticable, or not proper, the ſkin muſt be divided, and the depreſſed part of the ſternum lifted up into its place by means of an elevatory, or elſe by a ſcrew gently wormed into the part, and then pulled upwards. If, as it ſometimes happens after the reduction, violent pains continue under the ſternum, and if blood ſhould gather and ſuppurate internally between the duplicature of the mediaſtinum, it will not be improper to trepan the lower part of the ſternum, after the manner done to the cranium; and when the putrid matter is diſcharged, and the cavity cleanſed, it ſhould be carefully treated with ſome vulnerary balſam. Laſtly, if any blood ſhould be found extravaſated in the cavity of the thorax, the cure ſeems to depend entirely upon diſcharging this by the paracenteſis. See the articles ELEVATORY, TREPANNING, EXTRAVASATION, and PARACENTESIS. As to the buſineſs of dreſſing, after the application of compreſſes dipped in warm ſpirit of wine, we muſt go on with that kind of bandage called the napkin and ſcapulary.

STERNUTATION. See SNEEZING.

STERNUTATIVE, or STERNUTATORY, a medicine proper to produce ſneezing. Sternutatives are of two kinds, gentle and violent. Of the firſt kind are betony, ſage, marjoram, tobacco, and the whole faſhionable tribe of ſnuffs. Of the latter kind are euphorbium, white hellebore, pellitory, &c. Sternutatives operate by their ſharp pungent parts, vellicating the inner membrane of the noſe, which is exceeding ſenſible, and occaſioning the ſerous matter contained in the glands of the noſe and in ſeveral ſinuſes ſituated in the baſe of the cranium and the os frontis, to be expelled.

STETIN, a city and port-town of Germany, in the circle of Upper Saxony, capital of the dutchy of Pomerania, ſituated on the weſt ſhore of the river Oder: eaſt long. 14° 50′, north lat. 53° 30′.

STEVENAGE, a market-town of Hertfordſhire, ſituated thirty miles north of London, and ten north-weſt of Hertford.

STEVENSWAERT, a fortreſs of the Netherlands, in the province of Gelder, ſituated on the river Maes, twenty miles north-eaſt of Maeſtricht.

STEW, a ſmall kind of fiſh-pond, the peculiar office of which is to maintain fiſh, and keep them in readineſs for the daily uſe of a family, &c. The fiſh bred in the large ponds, are drawn out and put in here. For two large ponds of three or four acres a-piece, it is adviſeable to have four ſtews, each two rods wide, and three long. The ſtews are uſually in gardens, or at leaſt near the houſe, to be more handy, and the better looked to. The method of making them is to carry the bottom in a continued decline from one end, with a mouth to ſavour the drawing with a net. See FISH-POND.

STEWS, or STUES, were alſo places antiently permitted in England to women of profeſſed incontinency, for the proffer of their bodies to all comers. Theſe were under particular rules and laws of diſcipline, appointed by the lord of the manor.

STEWARD, an officer appointed in another's ſtead or place, and always taken for a principal officer within his juriſdiction. Of theſe there are various kinds. The greateſt officer under the crown is the lord high ſteward of England, an office that was antiently the inheritance of the earls of Leiceſter, till forfeited by Simon de Mountfort, to king Henry III. But the power of this officer is ſo very great, that it has not been judged ſafe to truſt it any longer in the hands of a ſubject, excepting only *pro hac vice*, occaſionally: as to officiate at a coronation, at the arraignment of a nobleman for high treaſon, or the like. During his office, the ſteward bears a white ſtaff in his hand, and the trial, &c. ended, he breaks the ſtaff, and with it his commiſſion expires. There is likewiſe a lord ſteward of the king's houſe-

hold, who is the chief officer of the king's court, has the care of the king's houſe, and authority over all the officers and ſervants of the houſhold, except ſuch as belong to the chapel, chamber, and ſtable. See the article HOUSHOLD.

There is alſo a ſteward of the marſhalſea, who has judicial authority. And in moſt corporations, and all houſes of quality in the kingdom, there is an officer of the name and authority of a ſteward. The ſteward of a ſhip is he who receives all the victuals from the purſer, and is to ſee it well ſtowed in the hold; all things of that nature belonging to the ſhip's uſe are in his cuſtody; he looks after the bread, and diſtributes out the ſeveral meſſes of victuals in the ſhip; he hath an apartment for himſelf in the hold, which is called the ſteward's room.

STEYNING, a borough town of Suffolk, ſituated forty miles ſouth of London, and thirteen miles weſt of Lewes.

It ſends two members to parliament.

STEYRE, or STEYREG, a town of Germany, in the circle and dutchy of Auſtria, ſituated on the north ſide of the Danube, eight miles north-weſt of Ens.

STIBIUM, *antimonium*. See ANTIMONY.

STICKLEBACK, in ichthyology, a common name for the three ſeveral ſpecies of the gaſteroſteus. See GASTEROSTEUS.

The common ſtickleback is that with three prickles on the back; the leſſer ſtickleback is that with ten prickles on the back; and the great ſea-ſtickleback has fifteen prickles on the back, grows to ſix or ſeven inches in length, and is moderately thick in proportion.

STIGMATA, in natural hiſtory, the apertures in different parts of the bodies of inſects, communicating with the tracheæ, or air veſſels, and ſerving for the office of reſpiration. Nature has given to theſe minute animals a much larger number of tracheæ and bronchia than to us; all the two winged and four winged flies, which have a ſingle or undivided corcelet, to which their legs are all fixed, have alſo four ſtigmata in that corcelet, two on each ſide; they have them alſo on the rings of their body, but thoſe on the corcelet are the moſt conſiderable. Of the four on the corcelet, the two anterior ones are uſually the largeſt; theſe, as well as the poſterior ones are oblong, and placed obliquely to the length of the body. The colour of the ſtigmata frequently differs from that of the corcelet; ſome are yellowiſh, others of a coffee-colour, or ſome degrees of a fallow colour, in flies whoſe corcelet is brown, black, or blue. Flies have, beſide theſe, ſeveral ſtigmata alſo in the rings of their bodies, perhaps in every one of them: theſe ſtigmata are not like thoſe of the corcelet, but are round, uſually a little eminent above the reſt of the ſurface, and reſembling a pin's head.

STIGMATA, in antiquity, certain marks impreſſed on the left ſhoulders of the ſoldiers when liſted.

STIGMATA were alſo kinds of notes or abbreviations, conſiſting only of points diſpoſed various ways, as in triangles, ſquares, croſſes, *&c.*

STIGMATIZING, among the antients, was inflicted upon ſlaves, as a puniſhment, but more frequently as a mark to know them by, in which caſe it was done by applying a red-hot iron marked with certain letters to their foreheads, till a fair impreſſion was made, and then pouring ink into their furrows, that the inſcription might be the more conſpicuous. Stigmatizing, among ſome nations, was, however, looked upon as a diſtinguiſhing mark of honour and nobility.

STIL *de grain*, in the colour-trade, the name of a compoſition uſed for painting in oil or water, and is made by a decoction of the lycium or avignon-berry in alum-water, which is mixed with whiting into a paſte, and formed into twiſted ſticks. It ought to be choſen of a fine gold-yellow, very fine, tender and friable, and free from dirt.

STILE, *ſtilus*. See the article STYLE.

STILES, in carpentry, denote the upright pieces which go from the bottom to the top of any wainſcot, or the like.

STILLATITIOUS OILS, ſuch as are produced by diſtillation, in oppoſition to thoſe got by infuſion, expreſſion, *&c.*

STILL-BOTTOMS, in the diſtillery, a name given by the traders to what remains in the ſtill after the working the waſh into low wines. Theſe bottoms are procured in the greateſt quantity from the malt-waſh, and are of ſo much value to the diſtiller, in the fattening of hogs, *&c.* that he often finds them one of the moſt valuable articles of the buſineſs. They might alſo, as Dr. Shaw obſerves, be put to other uſes, ſuch as the affording a large proportion of acid ſpirit, an oil, a fuel, and a fixed ſalt, and with ſome addreſs, and good management,

nagement, a vinegar and tartar; Another very advantageous uſe of them, is the adding them to the next brewing of the malt for more ſpirit: the increaſe of the produce from this is more than is eaſily conceived. It alſo more readily diſpoſes the new waſh to ferment, and gives the ſpirit a vinoſity, that it cannot have without it; the proportion in this caſe muſt never exceed that of a fifth or a ſixth part of the whole quantity of liquor employed. See DISTILLERY.

STILL-HOUSE. The Dutch have much the advantage of us in the ſtructure of their ſtill-houſes. The general rules in building thoſe houſes, according to Shaw, ſhould be ſuch as follow. The firſt caution is, to lay the floor aſlope, not flat, where any wet work is to be performed. It ſhould alſo be well flagged, with broad ſtones, ſo that no wet be detained in the crevices, but all may run off, and be let out at the drains made at the bottom and ſides. The ſtills ſhould be placed abreaſt on that ſide of the ſtill-houſe to which the floor has its current. Fronting the ſtills, and adjoining to the back of the wall ſhould be a ſtage for holding the fermenting backs, and theſe being placed at a proper height, may empty themſelves by means of a cock and a canal into the ſtills, which are thus charged with very little trouble. Near this ſet of fermenting backs ſhould be placed a pump or two, that may readily ſupply them with water, by means of a trunk, or canal, leading to each back; under the pavement adjoining to the ſtills ſhould be a kind of cellar, wherein to lodge the receivers, each of which ſhould be furniſhed with its pump, to raiſe the low wines into the ſtill for rectification; and through this cellar the refuſe waſh, or ſtill-bottoms, ſhould be diſcharged by means of a hoſe, or other contrivance.

STIMULATING, *ſtimulans*, a property in angular or ſharp bodies, whereby they vellicate and cauſe vibrations and inflections of the fibres of the nerves, and a greater derivation of nervous fluid into the parts affected. Stimulants produce pain, heat, redneſs, &c. They may be reduced to violent penetrating depilatories, gentle ſinapiſms, veſicatories, and cauſtics. See the articles SINAPISM, VESICATORY, &c.

STING, *aculeus*, an apparatus in the body of certain inſects, in form of a little ſpear, ſerving them as a weapon of offence. The ſting of a bee or waſp, is a curious piece of mechaniſm, it conſiſts of a hollow tube, at the root whereof there is a bag full of ſharp, penetrating juice, which in ſtinging, is injected into the fleſh, through the tube; within the tube, Mr. Durham has obſerved, there lie two ſharp ſmall bearded ſpears: in the ſting of a waſp, he told eight beards on the ſide of each ſpear, ſomewhat like the beards of fiſh-hooks. One of theſe ſpears in the ſting, or ſheath, lies with its point a little before the other, to be ready, as ſhould ſeem, to be firſt darted into the fleſh, which once fixed by means of its foremoſt beard, the other then ſtrikes too, and ſo they alternately pierce deeper and deeper, their beards taking more and more hold in the fleſh; after which the ſheath or ſting follows to convey the poiſon into the wound, which that it may pierce the better, is drawn into a point with a ſmall ſlit below that point for the two ſpears to come out at. By means of theſe beards, it is, that the animal is forced to leave its ſting behind it, when diſturbed, becauſe it can have no time to withdraw the ſpears into the ſcabbard.

STINK, or STENCH, a diſagreeable ſmell exhaling from a corrupted, or other body, and which is prejudicial to the noſe and brain. A ſtinking breath is uſually the reſult either of diſeaſed lungs, or elſe of ſcorbutic gums, &c. A ſtinking noſe is the reſult of a deep ulcer within the noſe, whence ariſe fetid ſcales, &c. See the article FOETOR.

STIPEND, *ſtipendium*, among the Romans, ſignified the ſame with tribute; and hence ſtipendiarii were the ſame with tributarii.

STIPULATION, in the civil law, the act of ſtipulating, that is, of treating and concluding terms and conditions to be inſerted in a contract. Stipulations were antiently performed at Rome, with abundance of ceremonies; the firſt whereof was, that one party ſhould interrogate, and the other anſwer, to give his conſent, and oblige himſelf. By the the antient roman law, no body could ſtipulate but for himſelf; but as the tabelliones were public ſervants, they were allowed to ſtipulate for their maſters, and the notaries, ſucceeding the tabelliones, have inherited the ſame privilege.

STIRIA,

STIRIA DUTCHY, in Germany, is part of the circle of Auſtria, bounded by the dutchy of Auſtria on the north; by Hungary on the eaſt; and by Carinthia and Carniola on the ſouth-weſt.

STIRLING, or STRIVILING, a town of Scotland, capital of the county of Stirling, ſituated on the river Forth, thirty miles north-weſt of Edinburgh, defended by a caſtle and other works.

STIRRUP, or STIRROP, in the manege, a reſt, or ſupport for the horſeman's foot, ſerving to keep him firm in his ſeat, and to enable him to mount. The great art of a cavalier in the antient tournaments, was to make his antagoniſt looſe his ſtirrup, that is, ſlip the foot out of it. For combating, it is a rule to have the right foot-ſtirrup ſomewhat ſhorter than the other. The ſtirrup-foot is the near, or the left foot before. Stirrup-leather is a thong of leather deſcending from the ſaddle by the horſe's ribs, upon which the ſtirrups hang, and the ſtirrup-bearer is an end of leather made faſt to the end of the ſaddle, to truſs up the ſtirrup when the rider is alighted, and the horſe ſent to the ſtable.

STIRRUP *of a ſhip*, a piece of timber put upon a ſhip's keel, when ſome of her keel happens to be beaten off, and they cannot come conveniently to put or fit in a new piece; then they patch in a piece of timber, and bind it on with an iron, which goes under the ſhip's keel, and comes up on each ſide of the ſhip, where it is nailed ſtrongly with ſpikes, and this they call a ſtirrup.

STIRUM, a town of Germany, in the dutchy of Berg, twelve miles north of Duſſeldorp.

STIVES, the antient Thebes, in the province of Achaia, now Livadia, in european Turkey. See LIVADIA.

STOAKED, on board a ſhip. When the water in the bottom cannot come to the well of the pump, they ſay, the ſhip is a-ſtoak, or ſtoaked. ſo they ſay alſo, the the limber holes are ſtoaked, when the water cannot paſs through them; and the pump is ſtoaked, when ſomething is got into it, which choaks it up, ſo that it will not work.

STOCKHERN, a town of Germany, in the circle of Weſtphalia, and biſhopric of Liege, ſituated on the river Maes, twelve miles north of Maeſtricht.

STOCK, in gardening, *&c.* the ſtem or trunk of a tree.

STOCKBRIDGE, a borough town of Hampſhire, ſituated ſeven miles north-weſt of Wincheſter.

It ſends two members to parliament.

STOCK-BROKER, ſee the article BROKER, and the next article.

STOCK-JOBBING, the art or myſtery of trafficing in the public ſtocks or funds. If ſtock-jobbers make any contract for the ſale of ſtock, when they are not actually poſſeſſed of, or intitled to the ſame, thoſe contracts will be deemed void. Likewiſe the parties ſo agreeing to ſell, are liable to a penalty of 500 l. The time of tendering ſtock ſold, is held to be the laſt hour of the day on which it was to be transferred, and then an actual transfer is not neceſſary, unleſs the perſon to whom it ought to be made be at the place and time ready to receive the ſame. See the article BROKER.

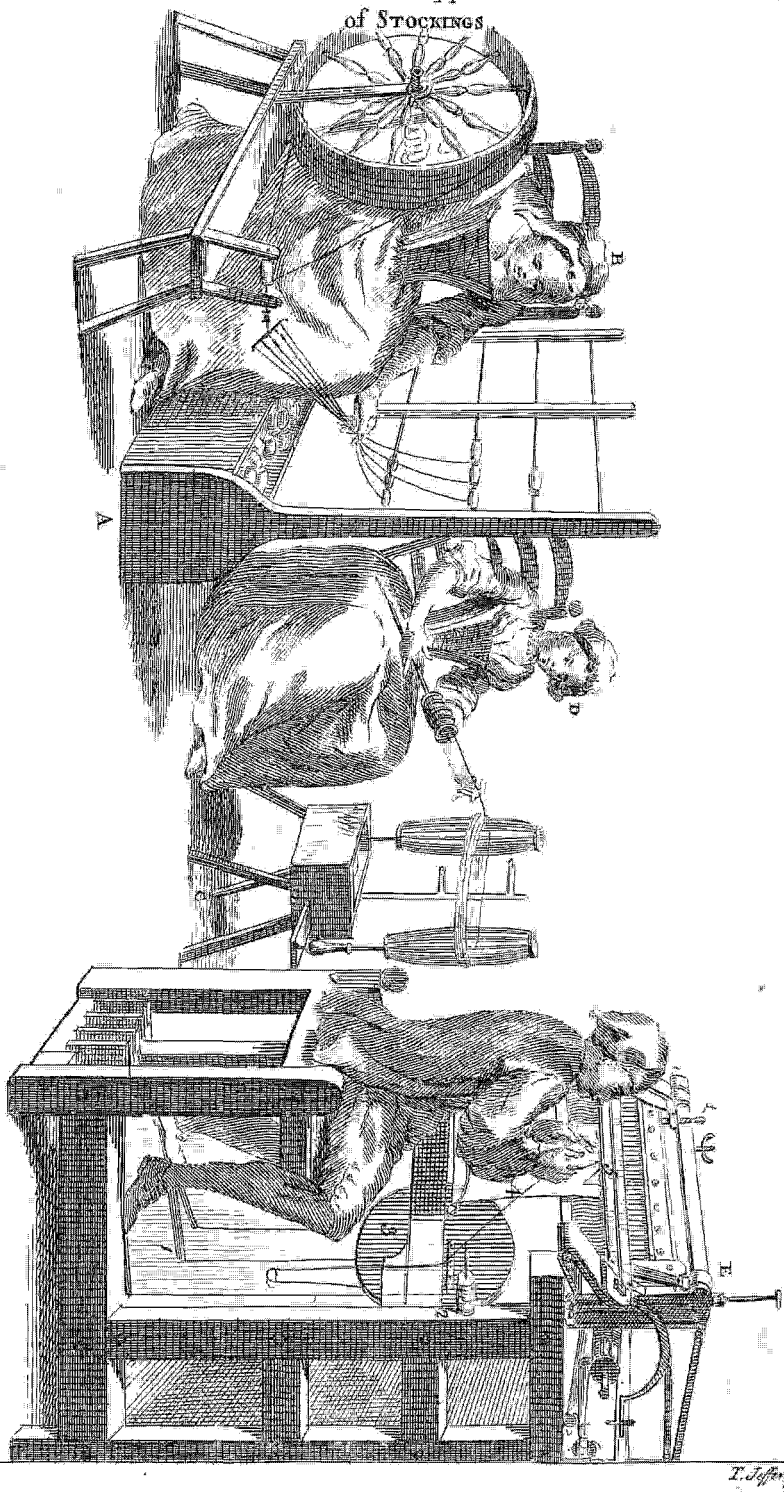
Capital STOCK. See the article CAPITAL.

STOCK-FISH, or STOCK-FISCH, in commerce, a kind of dried ſalted fiſh, of a greyiſh aſh-colour, and the belly ſomewhat whiter, being only cod-fiſh cured in a particular manner, which makes it neceſſary to beat it with ſticks before it is fit for dreſſing. See FISHERY.

STOCKHOLM, the capital city of Sweden, ſituated on ſeveral ſmall iſlands in the Meller Lake; eaſt long. 18°, north lat. 59° 30′, three hundred miles north-eaſt of Copenhagen; nine hundred north-eaſt of London; and four hundred weſt of Peterſburgh. It is neither walled nor fortified, being ſufficiently ſecured by nature, with little rocks and iſlands, which ſurround it, though it has a ſpacious harbour ſufficient for the largeſt fleets. That part of the town which is properly the city, ſtands upon a little iſland that is not more than a mile and a half in circumference, but the ſuburbs on the adjacent iſlands, are much larger. The inhabitants are computed about thirty-thouſand.

STOCKING, that part of the cloathing of the leg and foot which immediately covers their nudity, and ſcreens them from the cold, *&c.* Antiently, the only ſtockings in uſe were made of cloth, or of milled ſtuffs ſewed together; but ſince the invention of knitting and weaving ſtockings of ſilk, wool, cotton, thread, *&c.* the uſe of cloth ſtockings is quite out of doors. The modern ſtockings, whether woven or knit, are a kind of plexuſes, formed of an infinite number of

The STOCKING-FRAME, and other Apparatus used in the Manufactory of STOCKINGS



T. Jefferys sculp.

of little knots called ſtitches, loops, or maſhes, intermingled in one another. Knit ſtockings are wrought with needles made of poliſhed iron or braſs wire, which interweave the threads, and form the maſhes the ſtocking conſiſts of. This operation is called knitting, the invention whereof is commonly attributed to the Scots, on this ground, that the firſt works of this kind came from thence. It is added, that it was on this account that the company of ſtocking-knitters eſtabliſhed at Paris, in 1527, took for their patron St. Fiacre, who is ſaid to be the ſon of a king of Scotland. Woven ſtockings are ordinarily very fine; they are manufactured on a frame, or machine of poliſhed iron, the ſtructure and apparatus whereof being exceedingly ingenious, are repreſented in plate CCLXI. where A is the jack for the bobbins to turn upon; B is the ſizer, or woman whoſe buſineſs it is to twiſt the threads as they ſhall beſt ſuit the frame, in which the work is to be performed; C, the rices which wind the hanks or ſkains upon the bobbins for the uſe of the ſizer; D, the winder; and E the ſtocking frame, or engine, with the maker at work. 1. Are the treddles, like thoſe of other ſorts of looms; 2. is the bobbin of twiſted ſilk, *&c.* fixed on the bobbin-wire, which it turns with eaſe to feed the engine; 3. is the wheel, by whoſe motion the jacks are drawn together upon the needles; 4. is the ſilk, *&c.* which runs off the bobbin, and is in that poſture directed up to the needle to be looped; 5. is the needle on which the ſtockings are made according to art.

The Engliſh and French have greatly conteſted the honour of the invention of the ſtocking-loom; but we are aſſured, whatever pretenſions the French claim to this invention, that the ſame was certainly deviſed by William Lee, of St. John's College, Cambridge, in the year 1589, though it is true, that he firſt made it public in France, after deſpairing of ſucceſs in his own country.

Cotton and thread-ſtockings, the dozen, on importation, pay 8 s. 4 $\frac{53\frac{1}{4}}{100}$ d. and draw back on exportation, 7 s. 6 $\frac{56\frac{1}{4}}{100}$ d.

Frames and engines for the making and knitting of ſtockings, gloves, *&c.* ſhall not be exported upon penalty of 40 l.

STOCKPORT, a market-town of Cheſhire, ſituated thirty-four miles north-eaſt of Cheſter.

STOCKTON, a port-town of Durham, ſituated near the mouth of the river Tees, ſixteen miles ſouth of Durham.

STOCKZOW, a town of Bohemia, in the dutchy of Sileſia, ſituated on the river Viſtula, thirty-ſeven miles ſouth-eaſt of Troppaw.

STOCKS, among ſhip-carpenters, a frame of timber, and great poſts made aſhore, to build pinnaces, ketches, boats, and ſuch ſmall craft, and ſometimes ſmall frigates. Hence we ſay, a ſhip is on the ſtocks, when ſhe is a building.

STOCKS, *cippus*, a wooden machine to put the legs of offenders in, for the ſecuring of diſorderly perſons, and by the way of puniſhment in divers caſes, ordained by ſtatute, *&c.* And it is ſaid, that every vill within the precinct of a torn is indictable for not having a pair of ſtocks, and ſhall forfeit 5 l.

STOECHAS, in botany, a name whereby ſome authors call the lavandula. See the article LAVANDULA.

STOEBE, in botany, a genus of the *ſyngeneſia polygamia æqualis* claſs of plants; the hermaphrodite corolla of all the floſcules is equal; the proper one is monopetalous and funnel ſhaped; the limb is quinquifid and patulous; there is no pericarpium; the ſeed, which is contained in the cup, is ſolitary, oblong, and crowned with a long hairy pap.

STOICS, a ſect of antient philoſophers, the followers of Zeno, thus called from the greek στοα, which ſignifies a porch or portico, in regard Zeno uſed to teach under a portico, or piazza. It was the common fault of the ſtoics to introduce abundance of ſubtilty and dryneſs into their diſputations, either by word of mouth, or in writing. They ſeemed as carefully to avoid all beauty of ſtile, as depravity of morals. Chryſippus, who was one of the ſtoics, did no great honour to his ſect, and could only diſgrace it. He believed the gods periſhable; and maintained, that they would actually periſh in the general conflagration. He allowed the moſt notorious and moſt abominable inceſts, and admitted the community of wives amongſt ſages.

To the praiſe of the ſtoics in general, it muſt, however, be confeſſed, that, leſs intent than other philoſophers upon frivolous and often dangerous ſpeculations, they devoted their ſtudies to the clearing

up

up of thoſe great principles of morality which are the firmeſt ſupports of ſociety; but the dryneſs and ſtiffneſs that prevailed in their writings, as well as in their manners, diſguſted moſt of their readers, and abundantly leſſened their utility. Zeno's chief followers, among the Greeks, were Lucippus, Cleanthus, Chryſippus, Diogenes Babylonius, Antipater, Panætius, Poſſidonius, and Epictetus. Among the Romans, Cato, Varro, Cicero, Seneca, the emperor Antoninus, &c. The ſtoics cultivated logic, phyſics, metaphyſics, &c. but eſpecially ethics. The principal of their dogmata, of the former kinds, are, that there are certain catalepſias or comprehenſions, called alſo κοιναι εννοιαι, innate ideas or principles, naturally found in the mind; that God is the ſeminal cauſe of the univerſe, and with the Platoniſts, that the world is an animal, by reaſon of God's inhabiting and informing every part thereof; that nature is an artificial fire tending to generation; and that the world is at laſt to be deſtroyed by a conflagration. As for the morality of the ſtoics, it was couched much in paradoxes; as that a wiſe man is void of all paſſions, or perturbation of mind; that pain is no real evil, but that a wiſe man is happy in the midſt of torture, is always the ſame, and is always joyful; that there is none elſe free; that none elſe ought to be eſteemed king, magiſtrate, poet, or philoſopher; that all wiſe men are great men; that they are the only friends or lovers; that nothing can happen to them beyond their expectations; that all virtues are inſenſibly connected together; that all good things are equal, and equally to be deſired; that goodneſs admits of no increaſe or diminution. They own but one God, whom they however, call by various names, as Fate, Jupiter, &c. by which they did not mean various things, but various powers and relations of the ſame thing. Providence they expreſſed under the name Fate, which Chryſippus defines to be a natural ſeries, or compoſition of things mutually following each other, by an immutable nexus, or tie, fixed from all eternity. They held the immortality of the ſoul.

STOKEGOMER, a market-town of Somerſetſhire, ſituated twenty-two miles weſt of Wells.

STOKESLY, a market-town of Yorkſhire, ſituated thirty miles north of York.

STOLBERG, a town of Germany, in the circle of Upper Saxony, and territory of Thuringia, fifty-eight miles north-weſt of Leipſic.

STOLE, *ſtola*, a ſacerdotal ornament wore by the romiſh pariſh-prieſts over their ſurplice, as a mark of ſuperiority in their reſpective churches; and by other prieſts, over the alb, at celebrating of maſs, in which caſe it goes a-croſs the ſtomach; and by deacons, over the left ſhoulder, ſcarf-wiſe; when the prieſt reads the goſpel for any one, he lays the bottom of his ſtole on his head. The ſtole is a broad ſwath, or ſlip of ſtuff hanging from the neck to the feet, with three croſſes thereon. The biſhops antiently pretended, that the pariſh-prieſts were never to appear before them, but in their ſtole. In Flanders and Italy, they always preach in ſtoles; it is ſuppoſed to be a repreſentation of the extremities of the long robe, wore by the high-prieſt of the Jews.

Groom of the STOLE, the eldeſt gentleman of his majeſty's bed-chamber, whoſe office and honour it is to preſent and put on his majeſty's firſt garment, or ſhirt, every morning, and to order the things in the chamber. See BED-CHAMBER.

Order of the STOLE, an order of knights inſtituted by the kings of Arragon. Another military order, at Venice, is called the order of the golden ſtole; thus called from a golden ſtole, which thoſe knights wore over their ſhoulder, reaching to the knee, both before and behind, a palm and a half broad. None are raiſed to this order but patricians, or noble Venetians. It is uncertain when either of theſe orders was inſtituted.

STOLPE, a town of Germany, in the circle of Upper Saxony, and dutchy of Pomerania, ſituated on a river of the ſame name: eaſt long. 17°, north lat. 54° 36′.

STOMACH, στομαχος, in anatomy, is a hollow membraneous part, placed moſtly in the left hypocondrium, immediately under the diaphragm, and in an oblique ſituation, between the liver and the ſpleen. Its figure, as may be ſeen in our figure and deſcription of the inteſtines, is like that of the bag of a pair of bag-pipes. Its diviſion is into two parts, *viz.* into two orifices and a bottom. Its left orifice, called cardia, is placed much higher than its right, and is continuous with the gula, and furniſhed with a great number of nerves. Its right orifice is called

called the pylorus, and is connected with, or opens into, the inteſtines. In this part there is a ſingular valve, the office of which is, to cloſe the ſtomach. The pylorus is connected to the upper part of the ſtomach by a ligament. See HYPOCHONDRIA, DIAPHRAGM, &c.

The ſize of the ſtomach in human ſubjects is various; in people addicted to gluttony, it is uſually very large; and in men it is in general larger than in women. In the human body it is always ſingle, but many of the beaſts have ſeveral ſtomachs. Its veſſels are arteries, veins, nerves, and lymphatics. Its arteries, called gaſtricæ, it receives from the coeliac: the gaſtric veins all run to the vena portæ; among theſe are obſervable, the vaſa brevia, which go off to the ſplenic branch, and the vena coronaria, which ſurrounds the ſtomach. Its nerves principally enter at the left orifice; they come from the par vagum, and are very large, and hence it is, that the ſtomach is ſo ſenſible: the lymphatics go to the receptaculum chyli. The ſubſtance of the ſtomach is membranaceous, and is compoſed of four coats. The firſt coat is membranaceous, in the ſtrict ſenſe of the term: the fibres of this run tranſverſely. The ſecond is muſculous; in this the courſe of the fibres is various, and as it were inextricable. Some of them run circularly, as it were, from the upper part to the lower; and others only on the upper part of the ſtomach, between the two orifices; others run obliquely from the left ſide to the right, and ſome ſurround the orifice. The third coat of the ſtomach is nervous; this forms a multitude of wrinkles, and is furniſhed with a number of ſanguiferous veſſels, and ſmall glands, which ſecrete the liquor gaſtricus, or liquor of the ſtomach; this is more readily obſerved in hogs, than in the human body. The fourth is a thin, villoſe, and porous coat, and adheres very firmly to the former.

The uſe of the ſtomach is for the digeſtion of our food, that is, to receive, contain, diſſolve, and change what is ſwallowed by the mouth; and after a ſufficient concoction, to expel it through the pylorus into the inteſtines; poſſibly it alſo abſorbs, and retains the moſt ſubtle parts of what it has thus prepared for nutrition. It alſo is the organ in which the ſenſation of hunger reſides.

For the action of the ſtomach in turning the aliments into chyle, See CHYLIFICATION.

For an inflammation of the ſtomach. See the article INFLAMMATION.

Heat of the STOMACH. See SODA.

Heart-burn, or pain in the STOMACH. See the article CARDIALGIA.

STOMACHIA FEBRIS, the STOMACHIC FEVER, a name given to Heiſter, and others, to a ſpecies of fever, called by others, a meſenteric fever. See the article MESENTERIC FEVER.

STOMACHIC, in pharmacy, medicines that ſtrengthen the ſtomach, and promote digeſtion, &c. See DIGESTION.

Stomachic corroboratives are ſuch as ſtrengthen the tone of the ſtomach and inteſtines, among which are carminatives, as the roots of galangals, red gentian, zedoary, pimpinella, calamus aromaticus, and arum. Of barks and rinds, thoſe of canella alba, ſaſſafras, citrons, ſeville and china oranges, &c. Of ſpices, pepper, ginger, cloves, cinnamon, cardamums, and mace. Other things of this nature are, among ſimples, roman and common chamæmile, wormwood, mint, carduus benedictus, and the four carminative ſeeds. Of preparations, the oil of cedar, oil of oranges by expreſſion, oils of common chamæmile, daucus creticus, aniſum ſtellatum, cumin, caraway, mint, and wormwood, with the ſpirit of ſalt and ſweet nitre. Among compounds, are the ſal volatile ſylvii, the ſtomachic elixir, the eſſence of orange-peel, with ſweet ſpirit of nitre, tincture of tartar, oils of oranges prepared by expreſſion, the compound eſſence of wormwood, &c.

STOMACHIC, is alſo applied to the arteries, veins, &c. of the ſtomach. See the article STOMACH.

STOMACHUS, in anatomy, the ſame with the oeſophagus, or gula. See the article OESOPHAGUS.

STOMATIA, in natural hiſtory, a genus of ſimple ſhells, without any hinge, and formed of one piece; its figure is depreſſed and flat, its mouth the moſt patent of all the ſhells, the limpet only excepted; it has a ſhort ſpiral turn running into the mouth, at the head; and has no perforations in any part of the ſurface. The animal inhabiting this ſhell is a nereis.

STOMATICA, a term uſed by ſome for all medicines uſed in diſorders of the mouth and fauces.

STONES, in natural hiſtory, are defined to be eſſentially compound foſſils, not inflammable, nor ſoluble in water or

oil, nor at all ductile; found in continued ſtrata, or beds, of great extent; formed either of a congeries of ſmall particles, in ſome degree reſembling ſand, and lodged in a ſmoother cementitious matter, or elſe of this cementitious matter, and the gritt or ſand-like particles, running together into one ſmooth maſs; or, finally, of granules cohering by contact, without any cementitious matter among them; or compoſed of cryſtal or ſpar, uſually debaſed by earth, and often mixed with talc, and other extraneous particles. See the articles SAND, CRYSTAL, SPAR, TALC, *&c.*

Of this claſs of foſſils there are three orders; and under theſe, eight genera.

The firſt order comprehends all the coarſe, harſh, and rough ſtones, of a lax texture, and compoſed of a viſible gritt, reſembling ſand in form, and uſually immerſed in a cementitious matter, and of little natural brightneſs; ſcarce capable of any poliſh, and naturally mouldering away in form of powder from the tools of the workmen. The genera of this order are two, *viz.* the ammochiſta and pſaduria; the former of which conſtitute our grey and rough ſlates, and the latter comprehends moſt of the ſtones uſed in building, particularly portland ſtone. See SLATE and PORTLAND STONE.

The ſecond order conſiſts of ſtones, moderately fine, of a more compact and even texture, ſcarce diſtinguiſhable conſtruction, and affording no ſand-like particles to the view; of ſome natural brightneſs, capable of a tolerable poliſh, and flying off from the tools of the workmen in form of ſmall chips. Under this order are comprehended the ſympexia and ſtegania. See the articles SYMPEXIA and STEGANIA.

The third order conſiſts of ſtones, of a very fine ſubſtance and elegant ſtructure, naturally of a great brightneſs, and capable of an elegant poliſh; compoſed of granules of various ſhapes and ſizes, but uſually flattiſh, ſometimes more, ſometimes leſs diſtinct; and, in ſome ſpecies, running together into uniform maſſes, but never lodged in any cementitious ſubſtance. Of this order are the marbles, alabaſters, porphyries, and granites. See the articles MARBLE, ALABASTER, PORPHYRY, and GRANITE.

Figured or formed STONES, among naturaliſts, ſtones found in the ſhape of ſhells, or other parts of animals.

There are two very different opinions concerning the origin of theſe ſtones, which have occaſioned great diſputes among the learned. One is, that theſe bodies, though reſembling ever ſo exactly the ſea-fiſhes, yet never were in the ſea at all; but that the firſt ſemina of the ſea-ſhells, corals, and other ſubſtances, being carried by the ſea-water through the ſubterranean paſſages into all parts of the earth, even into the higheſt mountains, have been there left in vaſt numbers, and growing there among ſtony matter, have arrived at their true bulk and figure, but in a ſtony ſubſtance. But the other opinion ſeems to be a true one, which declares them to be all of marine origin at firſt, and that they were brought to the places where we find them in this foſſile ſtate, at the time of the univerſal deluge, and have been ſince altered into the nature of ſtones, by long lying in the earth in the way of waters impregnated with ſtony particles, which they have depoſited in them, after entering their ſubſtance in their paſſage through the earth. See SHELL.

As to the petrified teeth of animals, called by authors lycodontes, gloſſopetræ, *&c.* See the articles LYCODONTES, GLOSSOPETRA, *&c.*

STONE, *lithiaſis* and *calculus humanus*, in medicine, a ſtony or terreſtrial concretion in any of the urinary paſſages, which occaſions a difficulty in making water, and a pain in the ſmall of the back, or about the os pubis. When this collection is ſo large as to form one or more bodies, unable by reaſon of their ſize to paſs through the conduits of urine, they frequently cauſe great pain, ulcers in the parts, and an intire ſuppreſſion of urine; and, from the part where this obſtructing matter happens to lodge, this diſtemper receives its denomination, as from the kidneys, bladder, ureters, or urethra.

This diſorder, ſays Dr. Shaw, may ſometimes have an hereditary cauſe; that is, the urinary paſſages may be naturally ſtraighter than they ought to be; or the conſtitution may be naturally diſpoſed to generate a ſtony matter; an obſtructed perſpiration, and a cold or moiſt air, may alſo give riſe to it; for by means hereof the more heavy particles of the animal fluids will be detained in the body.

Another occaſion of this diſtemper may be the uſe of ſuch waters, as by running through various ſtrata of the earth, are impreg-

impregnated with ſtony particles. There are ſome wines too, and other liquors, which being either foul or not ſufficiently fined down, or abounding in tartar, or other terreſtrial corpuſcles, may lay the foundation for the ſtone. Again, in perſons ſubject to the aſthma or gout, who have a weak digeſtion, viſcid chyle, and ſtony concretions in the joints, there are manifeſt ſeeds of this diſtemper. In ſhort, whatever can bring on an accumulation of earthy particles in the urinary paſſages, whether by obſtructing or leſſening the capacity of the canals, or by immediately or remotely producing the ſubſtance itſelf, will cauſe gravel, and in time the ſtone.

The ſymptoms of the gravel or ſtone are, frequently, a nauſea and vomiting, with a numbneſs down the leg and thigh of the part affected; a pain fixed or moveable, great or leſs, in proportion to the bulk of impacted matter felt generally about the region of the loins, os pubis, and parts adjacent. This pain is very acute, and almoſt continual, when the gravel or ſtone remains at the head of the ureters; but begins to leſſen, as it is protruded forwards. Sometimes when the ſtone is angular, or continues long fixed, the urine is bloody; and, generally in nephritic obſtructions, it is thin, and made in a ſmall quantity, eſpecially at the beginning of the fit. Sometimes there happens a total ſuppreſſion of it, in which caſe both the ureters may be obſtructed. See ISCHURY.

When the obſtructed matter is forced into the bladder, the urine is turbid, and comes away plentifully; and there appears in it much ſand, and ſometimes ſmall ſtones; which when angular, are ſeldom voided without much pain: and when the paroxyſm is violent, and of long continuance, there ſometimes happens an entire ſuppreſſion of ſtool ſo far, that cathartics loſe their force; and ſometimes too, though rarely, the terreſtrial matter is depoſited in ſuch parts where the canals are lax and the circulation languid, ſo as at the ſame time to occaſion both an arthritic and a nephritic fit. When a ſtone is lodged in the urethra, the pain generally proves exquiſite, but limited to the part, where ſometimes the ſtone will bulge outwards, and may be felt with the fingers.

All paroxyſms in caſe of a confirmed ſtone, are dangerous. An accumulation of ſand in the kidneys or ureters, is leſs dangerous than a formed ſtone. A ſtone in the kidneys is of worſe conſequence than in the ureters, and more or leſs ſo in proportion to its bigneſs. The largeſt ſtone, naturally capable of paſſing the urethra in men, is ſuppoſed to be about the ſize of a ſmall hazel nut; but in women, one conſiderably larger may paſs the meatus urinarius. When both kidneys, or both ureters, are affected, it is ſo much the more dangerous, eſpecially if attended with ſharp pain, exulceration, inflammation, want of ſleep, loſs of ſtrength, a fever, ſuppreſſion of urine, &c. When the ſymptoms continue many days without intermiſſion, the caſe is deſperate; eſpecially if coldneſs has ſeized the extremities, the pulſe ticks, and the patient has cold ſweats, &c. When the caſe is habitual or hereditary, or happens in old age or gouty conſtitutions, it is difficult. The ſymptoms of bloody urine, continuing after the fit is gone off, prove hard to remove. When the urine is plentifully diſcharged, has its ordinary ſediment, is turbid, and the ſymptoms decreaſe, it is a ſign the paroxyſm is going off. If a large ſtone be long detained in the urethra, eſpecially if it be rugged, and can neither be propelled backwards nor forwards, and there be a total ſuppreſſion of urine, the caſe uſually proves mortal.

As to the method of cure, it conſiſts in the eaſy excluſion of the ſtone, and the preventing the breeding of others. To this purpoſe, Sydenham recommends bleeding, a poſſet-drink, in which two ounces of marſh-mallow roots have been boiled, and an emollient clyſter; after which, he adviſes a pretty large doſe of an opiate; that is, about twenty-five drops of the thebaic tincture, or fifteen grains of the ſaponaceous pills. And Huxham tells us, that nothing is ſo efficacious to eaſe the pain, and promote the deſcent of the ſtone through the ureters, as a tepid and emollient bath. Dr. Mead aſſures us, that it is an error in practice, to give ſtrong forcing diuretics, with a view of driving out the gravel with the urine: whereas this intention is anſwered with greater ſafety, in moſt caſes, by relaxing and lubricating medicines; eſpecially if, in caſe of violent pain, bleeding be premiſed, and anodynes interſperſed. He therefore adviſes, to give three or four grains of opium, diſſolved in five or ſix ounces of the common decoction, by way of clyſter. How-

ever, he allows, there are conjunctures, after the pain is abated, when powerful diuretics may be adminiſtered; but with this precaution, that as ſoon as they have had their effect, they are no longer to be continued. All this time the body ſhould be kept open, by giving a turpentine clyſter, and ſometimes purging gently with an infuſion of ſena and manna, becauſe ſtrong cathartics are to be avoided. The chief lubricating medicines are oil of ſweet almonds, ſyrup of marſhmallows, emulſions made with almonds, and the like; to which may be added the uſe of the warm bath. Soap and lime-water are alſo celebrated lithontriptics. See the articles SOAP, LIME, and LITHONTRIPTICS.

Such as have a ſtone in the bladder, ſhould, while they are taking the foreſaid medicines, have four ounces or upwards of tepid oyſter-ſhell lime-water injected into the bladder every day; taking care to evacuate their urine before injection, and to retain it as long as they can without pain. And were it not for the trouble of introducing the catheter, the injection might be made at leaſt twice every day; and if a flexible catheter were always kept in the bladder, it might be done at pleaſure, and the diſſolution of the largeſt ſtone quickly procured. The lime-water will be ſafer, and yet loſe nothing of its virtue, if a dram of ſtarch, or the fourth part of the yolk of an egg, be boiled in ſix or ſeven ounces of it.

Thoſe who, though they have no ſtone in the bladder, are nevertheleſs frequently troubled with fits of the gravel in the kidneys, may probably put a ſtop to the diſorder, by drinking every morning a pint of oyſter-ſhell lime-water, two or three hours before breakfaſt. Its diſagreeable taſte may be mitigated, by adding a very ſmall quantity of new-milk to it: alſo a dram and a half, or two drams, of juniper-berries, infuſed in every quart-bottle of it, will mend its taſte much.

As to the regimen to be obſerved, Dr. Mead recommends a mild diet, and ſuch as is eaſy of digeſtion; and wine and water, mead, or new ſoft ale, for drink; and gentle exerciſe, eſpecially riding. See the articles DIET and REGIMEN.

For the ſeveral operations in cutting for the ſtone, or the method of cure by extraction, ſee the article LITHOTOMY.

STONE alſo denotes a certain quantity or weight of ſome commodities. See the article WEIGHT.

A ſtone of beef, at London, is the quantity of eight pounds; in Herefordſhire, twelve pounds; in the north, ſixteen pounds.

A ſtone of wool (according to the ſtatute of 11 Hen. VII.) is to weigh fourteen pounds; yet in ſome places it is more, in others leſs; as in Glouceſterſhire, fifteen pounds; in Herefordſhire, twelve pounds.

A ſtone, among horſe-courſers, is the weight of fourteen pounds.

STONE, in geography, a market-town, ſeven miles north of Stafford.

STONE-BLUE, the ſame with ſmalt. See the article SMALT.

STONE-CHATTER, in ornithology, the engliſh name of the black motacilla, with a yellow throat and white belly: it is about the ſize of a linnet, and has a remarkable white ſpot on each ſide. See MOTACILLA.

STONEHENGE, in antiquity, a famed pile or monument of huge ſtones on Saliſbury plain, ſix miles diſtant from that city.

It conſiſts of the remains of four ranks of rough ſtones, ranged one within another, ſome of them, eſpecially in the outermoſt and third rank, twenty feet high, and ſeven broad; ſuſtaining others laid acroſs their heads and faſtened by mortiſes: ſo that the whole muſt have antiently hung together.

Antiquaries are now pretty well agreed that it was a britiſh temple; and Dr. Langwith thinks it might eaſily be made probable, at leaſt, that it was dedicated to the ſun and moon. Inigo Jones has given a fine ſcheme of the work, and ſtrives hard to perſuade the world, that it was Roman: but Dr. Langwith, who took his meaſures on the ſpot, aſſures us he could by no means reconcile them with that ſcheme.

STONY LANDS, in agriculture, ſuch as are full of flints, pebbles, or ſmall fragments of free-ſtone.

Theſe lands, in many places, yield good crops; and the general rule is, that, in cold and ſtiff lands, the ſtones ſhould be carefully removed; but, in light and dry lands, it will be advantageous to leave them. However, they always fallow theſe lands every other year, unleſs they ſow peaſe upon them; ſometimes they ſow them with lentils; and when they are quite worn out, they lay them down for clover, or rey-graſs.

STONY-

STONY-STRATFORD, a market-town of Buckinghamſhire, fourteen miles north of Aileſbury.

STOOL, *alvus*, in medicine, an evacuation or diſcharge of the fæces, &c. by the anus.

Spirit of vitriol, mixed with the patient's drink, is ſaid to be an excellent medicine in caſe of bloody ſtools. See the article DYSENTERY.

STOOL is alſo a kind of ſeat, without a back, much uſed by artificers, &c. and, among ſeamen, the reſts whereon the poop and top-lanterns ſtand, are called ſtools.

STOOMING *of wine*, is the putting bags of herbs, or other ingredients, into it. See the article WINE.

STOOPING, in falconry, is when a hawk being upon the wing, at the height of her pitch, bends down violently to take the fowl. See the articles FALCONRY and HAWKING.

STOP, in the manege, is a pauſe, or diſcontinuance of a horſe's motion.

To form a ſtop, you muſt, in the firſt place, bring to the calves of your legs to animate him, bend your body backwards, raiſe the bridle-hand without moving the elbow, then vigorouſly extend your hams, and reſt upon your ſtirrups, and make him form the times or motions of his ſtop, in falcading his haunches three or four times. After ſtopping your horſe, make him give three or four curvets. The oppoſite term of ſtop, is parting. In former times, the ſtop of a horſe was called parade.

Half a ſtop, is a ſtop not finiſhed, but a peſate; ſo that the horſe, after falcading three or four times upon the haunches, reſumes and continues his gallop, without making peſades or corvets.

STOPS, or POINTS, in grammar. See the articles POINT and PUNCTUATION.

STOPPER, in a ſhip, a piece of cable-laid rope, having a wale-knot at one end, with a laniard faſtened to it; and the other end is ſpliced round a thimble in the ring-bolts upon deck, and at the bits: its uſe is to ſtop the cable, that it may not run out too faſt; in order to which, they make turns with the laniard about the cable, and the wale-knot ſtops it, ſo that it cannot ſlip away faſter than is neceſſary.

STORAX, or STYRAX, in natural hiſtory and pharmacy, a dry and ſolid reſin, of a reddiſh colour, and a peculiarly fragrant ſmell, of which there are two kinds, the ſtyrax calamita, or ſtyrax in tears, and the ſtyrax vulgaris, whereof the former is by far the purer and finer kind, imported in ſmall looſe granules, or elſe in large maſſes compoſed of ſuch granules: it antiently uſed to be packed up in reeds, for the more ſecure carriage; whence the name. The common ſtorax is likewiſe a fine and pure reſin, though leſs ſo than the former; and is brought to us in large lumps, not formed of granules, but of one uniform conſiſtence.

Theſe are the two genuine kinds of ſtorax; but neither of them is that met with in our ſhops, which is a kind of ſaw-duſt connected into lumps, by juſt ſo much of the ſtorax-reſin as will make the other matters hang together. This is what our apothecaries uſe, under the name of ſtorax; but it is adviſeable, to ſtrain carefully the pure reſin from the filth, and uſe no part of the latter.

The two genuine kinds of ſtorax, which ought always to be uſed where they can be had, differ only in this; that the granulated ſtorax flows naturally from the ſtyrax-tree, and the common kind is obtained from the ſame tree, by inciſion. See the article STYRAX.

Storax is brought to us from Syria, and the Eaſt-Indies; and ought to be choſen pure, very fragrant, and of an acrid taſte. It is much recommended as a detergent and balſamic, in diſorders of the breaſt: it is alſo eſteemed a cordial, and is recommended in vertigos, and other diſorders of the head and nerves.

On importation, the ſtorax calamita pays a duty of $11\frac{62\frac{1}{2}}{100}$d. the pound; and draws back, on exportation, $10\frac{20}{100}$d.

Liquid STORAX, in pharmacy, is a drug very different from the reſin above deſcribed; being a reſinous juice, of the conſiſtence of venice-turpentine, or thicker: it is, when clean, pellucid, of a browniſh colour, with a caſt ſometimes of reddiſh, and ſometimes of greyiſh in it. Its ſmell is ſomewhat like that of common ſtorax, only much ſtronger, and even diſagreeable: its taſte is acrid, aromatic, and ſomewhat bitteriſh; and it is oily, or unctuous. It ſhould be choſen thin, pellucid, of a clean brown colour, and of a very ſtrong ſmell.

There is another coarſer and very impure kind, not at all pellucid, and of a grey or browniſh colour: its ſmell is much more languid, and alſo more diſagreeable than

than that of the pure kind; whereof it ſeems to be only the dregs, though it is by much the moſt common liquid ſtorax in the ſhops.

Petiver gives the moſt rational account of the origin of liquid ſtorax; which, he ſays, is prepared from the bark of a tree, called by the Turks roſa mallos, which is frequent in the iſland Cobras. The bark of this tree being bruiſed and macerated in ſea-water, is boiled to the conſiſtence of bird-lime; they then collect the reſinous matter that ſwims on the top; which, being foul, is boiled again in ſea-water, and ſtrained: what paſſes the bags is the finer, and what remains in them the coarſer liquid ſtorax. He adds, that liquid ſtorax is much eſteemed in the eaſt, as a perfume. As to its medicinal virtues, they are nearly related to thoſe of turpentine: it is preſcribed, internally, as a detergent and diuretic; and externally, to prevent mortifications. The French ſpeak much of the virtues of the ointment called unguentum de ſtyrace, which is thus prepared: melt in five ounces of nut-oil, gum-elemi and yellow wax, of each three ounces and three drams; add of colophony, ſeven ounces and a half: and when all theſe are perfectly melted together, add three ounces and three drams of pure liquid ſtorax; and let the whole be well mixed, and then cool.

STORGE, *ſοργη*, a greek term, frequently uſed for the parental inſtinct, or natural affection, which almoſt all animals bear their young; whereby they are moſt powerfully moved to defend them from dangers, and procure for them ſuitable nouriſhment.

STORK, *ciconia*, in ornithology, a ſpecies of ardea, with the long wing-feathers black: its general colour is white, which with the black wing-feathers makes a very pleaſing variegation: the legs are red, very long, and naked a great way up: when it ſtands erect, it is between three and four feet high; and its body is about the ſize of a gooſe.

But beſides the common ſtork, there are two other ſpecies of ardea known by the ſame name, *viz.* the black ſtork, with the breaſt and belly white, an erect and beautiful bird, ſomewhat larger than the common heron; and the braſilian ſtork, variegated with black and white, much about the ſize of the common heron. See the articles ARDEA and HERON.

STORM-BIRD, or STORM-FISH, *procellaria*, in ornithology. See PROCELLARIA.

STORMAR, the ſouth diviſion of Holſtein, whereof Hamburgh is the chief town.

STORTFORD, a market-town of Hertfordſhire, thirty miles north of London.

STOVES, in gardening, are buildings erected for the preſervation of tender exotic plants, which, without that aſſiſtance, will not bear the cold of our winter, becauſe they require an artificial warmth. Stoves are of two kinds, diſtinguiſhed by the names of the dry and the bark-ſtoves. The dry ſtove has the flues, in which the ſmoak is carried, either laid under the pavement of the floor, or erected in the back part of the houſe over each other, and returned ſix or eight times all along the ſtove. In theſe ſtoves the plants are placed on ſcaffolds, and benches of boards, raiſed above one another; and the plants, principally preſerved in theſe, are the aloes, cereuſes, euphorbiums, tithymals, and other ſucculent plants, which are impatient of moiſture in winter, and therefore are not to be kept among trees, or herbaceous, plants, which perſpire freely.

The bark-ſtoves are made with a large pit, nearly of the length of the houſe, which is three feet deep, and ſix or ſeven feet wide. This pit is to be filled with freſh tanner's bark to make a hot-bed, and in this the pots, containing the tender plants, are to be plunged.

This invention of tanner's bark for hot-beads, has been of prodigious ſervice to the curious in gardening, as many plants are, by this means, annually preſerved and raiſed, which no other method could have made endure our climate.

The dimenſions of theſe ſtoves muſt be wholly directed by the number of plants intended to be preſerved; and for the dry ſtove, the floor muſt be raiſed above the ſurface of the earth, more or leſs, according to the dryneſs or wetneſs of the ſoil. In the front there is to be a walk about twenty inches wide, for the convenience of walking. The fire-place may be made either in the middle, or at one end, and the furnace muſt be contrived according to the nature of the fuel which is to be burnt there. The beſt firing, when it can be had, is turf, for it burns longer, and more moderately, than any other fuel, as alſo more uniformly, and therefore requires leſs attendance.

The

The entrance into the bark-ſtove ſhould always be either out of a green-houſe, or the dry ſtove, or elſe through the ſhed where the fire is made; becauſe in cold weather the front glaſſes muſt not, by any means, be opened; and the top ſhould be covered either with tarpaulins, or ſliding ſhutters, in bad weather.

The tender ſhrubs and exotic plants muſt be plunged in their pots into the bark-beds; ſuch are the caſhew, cabbage-tree, cocoa-tree, dumb-cane, fuſtick, logwood, mancinel, papaw-tree, ſour-ſop, and the like; and upon the top of the ſtoves may be ſet the melon, thiſtle, the tender cereuſes, and the like.

The thermometer, by which the heat in the ſtove is regulated, muſt always be hung with its back to the ſun, and as far from the flues as may be. The proper ſtructure of theſe ſhelters, for the curious part of the vegetable creation, is to have a green-houſe in the middle, and two ſtoves, and a glaſs-caſe, at each end. See the article GREEN-HOUSE.

STOVE, among confectioners, denotes a little cloſet, well encloſed on all ſides; wherein they dry their ſweet-meats, ranged on ſeveral rows of ſhelves, made of wires.

STOUR, the name of ſeveral ſmall rivers, in England.

STOURBRIDGE, or STURBRIDGE, a market-town, nineteen miles north of Worceſter.

STOURBRIDGE is alſo the name of a field, near Cambridge, where Sturbridge-fair is kept yearly, on Sept. 7. and continues a fortnight.

STOW, a market-town, twenty miles eaſt of Gloceſter.

STOWAGE, in the ſea-language, the placing goods orderly in the hold of a ſhip, *viz.* the heavieſt next the ballaſt, *&c.*

STOWEY, a market-town of Somerſetſhire, eighteen miles weſt of Wells.

STOW-MARKET, a town of Suffolk, ten miles eaſt of Bury.

STRABISMUS, στραβισμὸς, SQUINTING, in medicine and ſurgery, a diſtortion of the eyes, whereby their pupils are turned from, inſtead of being directed towards, objects at which they look: ſometimes only one eye, but more frequently both are thus affected.

This diſorder is frequently cauſed in infants, from letting them conſtantly ſuck at one and the ſame breaſt; or from placing them in the cradle, ſo as that they always look the ſame way towards the light or window; by which repeated action, the muſcles on that ſide become too ſtrong to be ballanced by their oppoſite muſcles; and hence the eye is contorted, or looks obliquely at objects. But it may be alſo owing to convulſive and epileptic motions, to which the eyes of infants are extremely ſubject. And, laſtly, it may proceed, as well in adults as infants, from a ſpaſm, or rigor, or from a palſy in ſome of the muſcles of the eye; as alſo from a defect, or inſenſibility, of ſome part of the retina.

Squinting is a diſorder very difficult to be cured, eſpecially when in adults, and cauſed by ſome defect in the muſcles, or retina: but, in young infants, it may probably be cured, ſays St. Yves, by frequently placing them before a looking-glaſs, that their eyes may be directed towards the image of their own face. Thoſe more advanced in years may be aſſiſted by reading very ſmall writing or print; or by inſpecting very minute objects, provided they turn their eyes even, and bathe them at times with hungary-water. Others propoſe to cure this diſorder with a ſort of maſk, or eye-ſwath, repreſented in plate CCLXII. fig. 2. But this method is ſeldom practicable, through the moroſeneſs of infants, and other impediments.

STRADELLA, a town of the dutchy of Milan, in Italy, ſituated on the ſouth ſide of the river Po, fourteen miles ſouth-eaſt of Pavia.

STRAIGHT, STREIGHT, or STRAIT, in hydrography. See STRAIT.

STRAIN, in ſurgery, a violent extenſion of the ſinews, or tendons, of ſome muſcle.

STRAIT, or STREIGHT, in hydrography, is a narrow paſſage out of one ſea into another, as thoſe of Gibraltar and Magellan.

STRAKES, in the ſea-language, ſignify the uniform ranges of planks on the bottom, decks, and ſides of ſhips; and the garboard-ſtrake is that next the keel.

STRALSUND, a ſtrong city and port-town of Germany, in the circle of upper Saxony and dutchy of Pomerania, ſubject to Sweden: eaſt longit. 13° 22′, and north lat. 54° 23′.

STRAMONIUM, and STRAMONIOIDES, in botany, a plant called by Linnæus datura. See the article DATURA.

STRAND, ſignifies any ſhore of the ſea, or bank of a great river: hence an immunity

munity from paying cuſtoms on goods or veſſels, was antiently expreſſed by ſtrand and ſtream.

STRANDED, among ſeamen, is ſaid of a ſhip that is driven aſhore by a tempeſt, or runs on ground through ill ſteerage, and ſo periſhes.

Where any veſſel is ſtranded, the juſtices of the peace are impowered to command the conſtables near the ſea-coaſt to call aſſiſtance, in order to preſerve the ſame, if poſſible.

STRANGER, in law, ſignifies a perſon who is not privy to ſome act: thus, a ſtranger to a deed, is any perſon who has nothing to do therewith; in which ſenſe it is oppoſed to party or privy.

STRANGFORD, a town of Ireland, that gives name to a lough and bay, in the county of Down and province of Ulſter, ſituated nine miles eaſt of Down.

STRANGURY, in medicine, a difficulty of making water, wherein the urine comes away drop by drop, and is attended with a ſpaſmodic pain about the ſphincter and neck of the bladder; in which ſenſe it is diſtinguiſhed from a dyſury and iſchury. See DYSURY and ISCHURY.

As to the treatment, in order to obtund the acrimony of the blood, and take off the ſpaſtic motions, there is no medicine ſo uſeful as nitre, whether given alone, or mixed with ſome abſterſive ſalt, or with an abſorbent, mixed with a ſmall quantity of an acid to ſaturate it, and with a little cinnabar. A compound powder may be prepared of theſe ingredients, and a ſcruple of it given four times a day, will uſually ſoon take off the complaint. The cooling emulſions, made with barley-water and almonds, and with the cold ſeeds, are alſo of great ſervice: and when there is farther occaſion for medicines, gum arabic, and pills of boiled turpentine, are found very good ones; and decoctions of liquorice-roots in barley-water, with ſyrup of marſh-mallows, may be drank in large draughts. Many people are alſo fond of external remedies, and recommend onions, roaſted and buttered, to be applied to the pubes, and goat's ſuet to be rubbed warm about the navel.

A common ſtrangury is often carried off by mere diluters, ſuch as tea, barley-water, or any other watery liquor, drank in large quantities, till a ſweat comes on; and in the gentler caſes, where theſe alone are not quite effectual, there is no better addition to them than a little nitre. Bleeding in time often prevents great miſchiefs from theſe diſorders; and in caſes of a dyſury, brought on by the taking cantharides, there is no remedy ſo powerful as warm milk alone, drank in large quantities. Mr. Boyle has alſo ſaid much in favour of venice-ſoap on this occaſion.

STRANRAVER, a parliament-town of Scotland, ſituated in the ſhire of Galloway, on a bay of the frith of Clyde.

STRAP, among ſurgeons, a ſtrong piece of leather, or the like, uſed for ſtretching limbs, in the ſetting broken or diſlocated bones. See the articles DISLOCATION, LUXATION, HUMERUS, &c.

STRAPS *of a ſaddle*, are ſtrong leather-thongs, nailed to the bows of a ſaddle, in order to make the girths, &c. faſt. See the article SADDLE.

STRAP, in a ſhip, is a rope ſpliced about any block, or made with an eye, to faſten it any where, on occaſion.

STRAPADO, or STRAPPADO, a kind of military puniſhment, wherein the criminal is hoiſted up by a rope, and let down, ſo that, by the weight of his body in the fall, his arms are diſlocated.

STRASBURG, a free imperial city of Germany, capital of the landgraviate of Alſace, ſituated near the weſtern bank of the Rhine, in eaſt longit. 7° 35′, and north lat. 48° 38′.

STRATA, in natural hiſtory, the ſeveral beds or layers of different matters, whereof the body of the earth is compoſed.

The ſtrata include all the layers of earths, minerals, metals, ſtones, &c. lying under the upper tegument, or ſtratum, the turf or mould.

The time when theſe ſeveral ſtrata were laid, was doubtleſs at the creation; unleſs, with ſome great naturaliſts, as Steno, Dr. Woodward, &c. we ſuppoſe the globe of the earth to have been diſſolved by the deluge. See DELUGE.

The moſt frequent opportunities we have of obſerving theſe in England, is in the coal-mines; where we find them lying in a regular manner, on what appears to us a plane, as we ſee any ſmall part of it: but when we conſider the ſame ſtrata, according to the globular figure of the earth, and ſuppoſe the maſs of the earth to conſiſt of the foregoing, and perhaps in different parts, and at different depths, of ſtrata of ten thouſand other kinds, all originally, while in a ſoft and fluid ſtate, tending toward the center, we ſhall find

that

that it muſt mechanically and almoſt neceſſarily follow, by the continual revolution of the crude maſs from weſt to eaſt, like the winding up of a jack, or the rolling up of the leaves of a paper-book, that every one of theſe ſtrata, though they each reach the center, muſt, in ſome place or other, appear to the day, or on the ſurface. In which caſe there needs no ſpecific gravitation to cauſe the lighteſt to be uppermoſt; and were it practicable to ſink to the center of the earth, all the ſtrata that are would be found in every part, and, according to the poet, *ponderibus liberata ſuis*. Add to this, that, according to an obſervation of Dr. Stukely, the precipices of all hills are to the weſtward, whereas the aſcent to the eaſt is more gradual.

STRATAGEM, or STRATEGEM, in the art of war, any device for the deceiving and ſurpriſing an enemy.

STRATEGUS, in grecian antiquity, an annual officer among the Athenians, whereof there were two choſen, to command the troops of the ſtate.

STRATFORD, a market-town, ſituated ſix miles ſouth of Warwick.

STRATHNAVER, a ſubdiviſion or diſtrict of the county of Sutherland, in Scotland, having the Caledonian ocean on the north and weſt.

STRATIFICATION, in chemiſtry, the ranging any thing to be calcined in ſeveral layers or ſtrata one above another; which operation is denoted by the abbreviation *ſ. ſ. ſ.*

STRATIOTES, the FRESH-WATER-SOLDIER, in botany, a genus of the *polyandria-hexagynia* claſs of plants, the flower of which conſiſts of three obverſely cordated erecto-patent petals; the fruit is an oval berry, attenuated at each end, and covered with the cup; it conſiſts of ſix cells, and contains numerous, oblong, crooked, and, as it were, alated ſeeds.

STRATIOTES is alſo a name given to the hottonia and hydrocharis, two diſtinct genuſes of plants. See HOTTONIA and HYDROCHARIS.

STRATTON, a market-town of Cornwal, ſituated a little ſouth of the Briſtol channel, fourteen miles north-weſt of Launceſton.

STRAUBING, a city of Bavaria, ſituated on the Danube, twenty miles ſouth-eaſt of Ratiſbon.

STRAWBERRY, *fragaria*, in botany. See the article FRAGARIA.

Strawberry-leaves are ſomewhat ſtyptic and bitteriſh; and hence may be of ſome ſervice in debility and laxity in the viſcera, and immoderate ſecretions: they are alſo recommended in hæmorrhages and fluxes. The fruit is very grateful both to the palate and ſtomach, abating heat, quenching thirſt, looſening the belly, and promoting urine.

STRAWBERRY-TREE, *arbutus*, in botany. See the article ARBUTUS.

STRAY, or ESTRAY, in law. See ESTRAY.

STREAM-ANCHOR. See ANCHOR.

STRENÆ, in antiquity, preſents made on new-year's day, as a happy augury for the enſuing year.

STRENGTH, *vis*, in phyſiology, the ſame with force. See FORCE and POWER.

The ſtrengths of different animals of the ſame ſpecies, or of the ſame animal, at different times, are demonſtrated to be in a triplicate proportion of the quantities of the maſs of their blood; the whole ſtrength of an animal is the force of all the muſcles taken together; therefore, whatever increaſes ſtrength, increaſes the force of all the muſcles, and of thoſe ſerving digeſtion as well as others. See MUSCLE.

STRENGTHENERS, in pharmacy, medicines that add to the bulk and firmneſs of the ſolids: and ſuch are all abſorbent, agglutinant, and aſtringent medicines. See ABSORBENTS, AGGLUTINANTS, and ASTRINGENTS.

Medicines of this kind are of great ſervice in hectics, conſumptions, and the like diſorders.

STRIÆ, in the antient architecture, the ſame with the flutings of columns. See the article FLUTING.

Among naturaliſts, the term ſtriæ denotes the ſmall channels and ridges in ſcollop-ſhells, *&c.*

STRIATED LEAF, among botaniſts, one that has a number of longitudinal furrows on its ſurface.

STRICTOR, in anatomy, the ſame with conſtrictor and ſphincter. See the articles CONSTRICTOR and SPHINCTER.

STRIKE, a meaſure of capacity, containing four buſhels. See MEASURE.

STRIKE, among ſeamen, is a word variouſly uſed: when a ſhip, in a fight, or on meeting with a ſhip of war, lets down or lowers her top-ſails, at leaſt half-maſt-high, they ſay ſhe ſtrikes, meaning ſhe yields, or ſubmits, or pays reſpect to the ſhip of war. Alſo, when a ſhip touches ground, in ſhoal-water, they ſay ſhe ſtrikes. And when a top-maſt is to

be taken down, the word of command is, ſtrike the top-maſt, *&c.*

STRING, or CHORD, in muſic. See CHORD.

STRIX, the OWL-KIND, in ornithology, a genus of birds, with four toes on each foot; three of which ſtand forward, and the other backward.

To this genus belong the bubo, or great horned owl, the ſcops, *&c.* See the articles BUBO, SCOPS, *&c.*

STROBILUS, among botaniſts, a kind of pericarpium, formed of a number of vaginæ, with contorted points applied cloſe to one another. See PERICARPIUM.

STROMATEUS, in ichthyology, a genus of fiſhes of the malacopterygious, or ſoft-finned, kind, the characters of which are theſe: the body is very much compreſſed, and very broad and thin; it has no belly-fins, and has only one back-fin, which is extended over the whole back. The only known ſpecies of this genus is the callichthys of authors, a fiſh called the fiatola at Rome: the tail of which is very forked; the mouth is very ſmall; the teeth are placed in the jaws and palate; and the tongue is ſmooth and broad: the body is ſtriped croſs-ways.

STROMBOLI, one of the Lipari-iſlands, fifty miles north of Meſſina.

STRONGOLI, a town of the hither Calabria, in the kingdom of Naples, ſituated on the gulph of Taranto.

STROPHE, in antient poetry, a certain number of verſes, including a perfect ſenſe, and making the firſt part of an ode. See the article ODE.

STROUD, a market-town, nine miles ſouth of Glocester.

STRUMÆ, ſcrophulous tumours ariſing on the neck and throat, conſtituting what is commonly called the king's evil. See the article SCROPHULA.

STRUTHIA, in botany, the ſame with the gnidia. See the article GNIDIA.

STRUTHIO, the OSTRICH, in ornithology. See the article OSTRICH.

STRUTHIUM, in botany, the ſame with the luteola, or dyer's weed. See LUTEOLA.

STRYCHNUS, in botany, a genus of the *pentandria-monogynia* claſs of plants, with a monopetalous flower, quinquifid at the limb; its fruit is a very large and ſmooth unilocular berry, full of a pulpy matter, and containing orbiculated ſeeds, with hairs radiated from their edges.

STRYMON, or AMPHIPOLIS. See the article AMPHIPOLIS.

STUC, or STUCCO, in building, a compoſition of white marble, pulveriſed and mixed with plaſter of lime; and the whole being ſifted and wrought up with water, is to be uſed like common plaſter: this is what Pliny means by marmoratum opus, and albarium opus.

STUFF, in commerce, a general name for all kinds of fabrics of gold, ſilver, ſilk, wool, hair, cotton, or thread, manufactured on the loom; of which number are velvets, brocades, mohairs, ſattins, taffeties, cloths, ſerges, *&c.* See the articles VELVET, BROCADE, *&c.*

STULINGEN, a town of Swabia, in Germany, thirty-five miles weſt of Conſtance.

STUL-WEISSENBURG, a city of lower Hungary, thirty-ſix miles ſouth-weſt of Buda.

STUM, in the wine-trade, denotes the unfermented juice of the grape, after it has been ſeveral times racked off, and ſeparated from its ſediment. The caſks are, for this purpoſe, will matched, or fumigated with brimſtone every time, to prevent the liquor from fermenting, as it would otherwiſe readily do, and become wine. See MATCHING.

It is this fume of the ſulphur from the match, that prevents, in this caſe, all tendency to fermentation, and continues the natural juice of the grape in a ſweet ſtate, fit to be readily mixed with wines inſtead of ſugar; for which purpoſe it is very much uſed in Holland, and ſome other countries; as alſo for giving a new fret, or briſkneſs to decayed wines: ſo that very large quantities of this ſtum are annually imported to all parts, along with the foreign wines. And after the ſame manner a ſtum is prepared in England, from the juice of apples, which ſerves the ordinary purpoſes of the wine-cooper. In the preſerving this liquor in this ſtate, we ſee the vaſt uſe of brimſtone, for it could never be done otherwiſe than by the matching of the caſks.

Dr. Shaw gives the following method of preparing an artificial ſtum, nothing inferior to the natural; and as fit for the refermenting, fretting, improving, or making of wines, vinegars, and ſpirits. Take three pound of fine lump-ſugar, or ſuch as has been well refined from its treacle; melt it in three quarts of water, and add, in the boiling, of rheniſh tartar, finely powdered, half an ounce; this diſſolves with a remarkable ebullition, and gives a grateful acidity to the liquor: take the veſſel from the fire, and ſuffer it to cool, and you have an artificial muſt, which

which in all reſpects reſembles the natural taſte and ſweet juice of a white flavourleſs grape, when well purified, and racked off from its ſediment, in order to make ſtum. If this artificial muſt be ſtummed, that is, well fumigated with burning brimſtone, it becomes a perfect ſtum, and may be made of any flavour, at the diſcretion of the artiſt.

STUNG, or ADDER-STUNG. See the article ADDER.

STUPEFIERS, in medicine, the ſame with narcotics and opiates. See the articles NARCOTICS and OPIATES.

STUPOR, a numbneſs in any part of the body, whether occaſioned by ligatures obſtructing the blood's motion, by the palſy, or the like.

STUPHA, or STUPE, in medicine, is a piece of cloth dipped in ſome proper liquor, and applied to an affected part, by way of fomentation or epithem. See the articles FOMENTATION and EPITHEM.

STURGEON, *ſturio*, in ichthyology, a ſpecies of accipenſer, with the body armed with rough tubercles. See the article ACCIPENSER.

The ſturgeon is a very large fiſh, growing to fourteen, ſixteen, or eighteen feet in length; though the greater part are caught much ſmaller. There are four cirri at the extremity of the under jaw; the eyes are large, and ſtand at a great diſtance from the extremity of the roſtrum or ſnout: but what is very ſingular in the ſturgeon, is the ſpinoſe tubercles, of which there are ſeveral ſeries or rows. See plate CCLXII. fig. 4.

STURMINSTER, a market-town, eighteen miles north of Dorcheſter.

STURNUS, the STARLING, in ornithology. See the article STARLING.

STUTGART, a city of Swabia, ſituated on the river Neckar, in eaſt long. 9°, and north lat. 48° 40′.

STYE, or STITHE, a diſorder of the eyelids; being a ſmall encyſted tumour, about the bigneſs of a barley-corn.

The ſtye frequently occaſions much pain and uneaſineſs, and muſt be treated with great caution, on account of the tenderneſs, of the eye. Some recommend cataplaſms, and the like applications, to theſe; but the eye is often hurt by thoſe applications, and it is obſerved beſides, that theſe tubercles ſeldom give way to topical applications of any kind.

When they are ſmall, Heiſter thinks it beſt to let them take their own courſe; but if ſo large as to occaſion deformity or danger of hurting the ſight, the way to extirpate them, is to make a longitudinal inciſion on the part, and carefully take them out whole; or, if it cannot be thus got out clean, it muſt be cut out, as far as may be done, with ſciſſars, and dreſſed with ægyptian ointment, and a little red precipitate, or touched at times with the common cauſtic, till eaten thoroughly away, and then the wound dreſſed and healed in the common manner.

This is the method by which the flat and broad-bottomed tumours of this kind are to be extirpated; and in this, great care muſt be taken that none of the ſharp applications touch the eye, as they might injure the ſight. It is common, however, with theſe tumours to hang by a ſort of ſmall root, and then they are much more eaſily managed, there being no more neceſſary than the cutting them cloſe off, with a pair of ſciſſars, or the tying them firmly round with a piece of ſilk or horſe-hair. They are ſometimes, if taken in time, diſperſed by rubbing them with faſting ſpittle, or by applying the pulp of a roaſted apple mixed with ſome ſaffron and camphor.

STYGIAN LIQUORS, an appellation given to cauſtic and corroſive waters, and particularly to aqua regia. See the article AQUA.

STYLE, a word of various ſignifications, originally deduced from στυλος, a kind of bodkin, wherewith the antients wrote on plates of lead, or on wax, *&c.* and which is ſtill uſed to write on ivory-leaves, and paper prepared for that purpoſe, *&c.*

Lapidary's STYLE. See LAPIDARY.

STYLE, in dialling, denotes the gnomon or cock of a dial, raiſed on the plane thereof, to project a ſhadow. See the articles DIAL and GNOMON.

STYLE, in botany, is a part of the piſtil of plants, and is of various figures, but always placed on the germen: it gives origin to the ſtigma. In ſome plants it is extremely ſhort, and in others it ſeems entirely wanting. See the articles PISTIL, STIGMA, and GERMEN.

STYLE, in matters of language, a particular manner of expreſſing one's thoughts agreeably to the rules of ſyntax; or, as F. Buffier more accurately defines it, the manner wherein the words, conſtructed according to the laws of ſyntax, are arranged among themſelves, ſuitably to the genus of the language.

From this deſcription it appears, that the ſtyle ſuppoſes, or includes the ſyntax; and

that ſyntax does not extend ſo far as ſtyle, for the ſyntax may be juſt, where the ſtyle is wretched. A fault in ſtyle is not leſs a fault againſt grammar, than is a fault in ſyntax; only the former is leſs preciſe and palpable than the latter. A very common error in grammarians, F. Buffier adds, is to confound two kinds of ſtyles in one: grammatical ſtyle, or that directed by the rules of grammar; and the perſonal ſtyle, which depends leſs on the grammar than on the perſon that writes, whether with regard to his particular taſte and genius, or with regard to his matter, or the kind or character of his work. There are a great many differences between the two; the moſt eſſential is, that the one may be diverſified an infinite number of ways, and the other cannot. In effect, the perſonal ſtyle is naturally variable, according to the different genius, humours, and complexions.

It is the imagination that acts, that conceives, that propoſes, and that expreſſes things, according to its character, which is different in all men, and which is to be varied according to the particular kind of the work. Hence ariſe the gay, the grave, the florid, the jejune, the copious, the conciſe, the poetical, the epiſtolary, and the burleſque ſtyles. Theſe perſonal ſtyles are all independent on the grammatical; and we have authors who excel in the one, and are miſerably defective in the other. The perſonal ſtyle is not under the direction of grammar, but of the imagination, or rather of rhetoric, that art having to do directly with our thoughts, as grammar with our words. This, however, may be ſaid, that grammar is far from being able to vary the ſame words of a phraſe, with equal perfection; and that there is but one way of delivering them in the taſte and genius of the language.

In oratory and poetry, ſtyle is reſtrained wholly to what F. Buffier calls the perſonal ſtyle. Language refers principally to the matter of the diſcourſe, *viz.* the words; elocution to the particular members or parts thereof; and ſtyle to the whole compoſition. The maſters of the art reduce the kinds of ſtyle to three; the ſublime, the low, and the intermediate or equable ſtyle. The ſublime ſtyle is that conſiſting in magnificent words and ſentences; which, by its noble boldneſs, raviſhes the hearers, and extorts admiration, even from the unwilling. See the article SUBLIME.

Low or ſimple ſtyle is that ordinarily uſed in ſmaller and humbler works, as epiſtles, dialogues, and common diſcourſe. The chief virtues hereof are perſpicuity, ſmoothneſs, eaſineſs, and cleanlineſs. It muſt be very ſparing in the uſe of tropes and figures, eſpecially the more violent ones, as the proſopopœia, apoſtrophe, *&c.* See the article PROSOPOPOEIA, *&c.*

Intermediate or equable ſtyle partakes of the magnificence of the ſublime, and the ſimplicity of the low. It neither riſes to the majeſty of the one in words and ſentences, nor yet is ſmartly pointed like the other. Tully calls this the poliſhed and florid ſtyle; it being in this that all the graces and beauties of language are principally to be uſed.

As to the choice of ſtyle in the general, the nature of the ſubject is to determine it. Such ſtyle, ſays Cicero, is to be choſen as expreſſes great things magnificently, middle things moderately, and low things ſubtilly: but more particularly as there are three branches of the duty of an orator, to teach, to delight, and to move; the ſimple ſtyle is uſed to teach, the middle to delight, and the ſublime to move. Again, the ſimple or low ſtyle is fit for comedy, the ſublime for tragedy, and the middle for hiſtory. Again the ſimple ſtyle is fit for bucolics and eclogues, the intermediate for georgics, and the ſublime for epics: which triple difference we may diſcern in Virgil, though he ſometimes mixes them all in the Æneid itſelf, uſing the ſimple ſtyle in the fifth book, where he deſcribes games; and the intermediate in the beginning of the poem. Care is ſtill to be taken that the ſtyle be not flat and dull, on pretence of being ſimple.

The chief faults in ſtyle are its being tumid and ſwoln, or cold and puerile, or ſtiff, or looſe, or dry and jejune. A tumid ſtyle is that immoderately ſtuffed with big words and ſentences. Frigid or puerile ſtyle is that which affects certain trifling ornaments, inſipid jeſts, remote and ſtrained alluſions, redundant deſcriptions, *&c.* Looſe ſtyle is that which, wanting articles, numbers, *&c.* fluctuates here and there, not connected or joined together. Dry jejune ſtyle, is that which is deſtitute of ornament, ſpirit, *&c.*

The antients made a notable diſtinction of ſtyles into Laconic and Aſiatic: laco-

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nic ſtyle is diſtinguiſhed by its exceeding conciſeneſs, and by comprehending a deal of matter under a few words: aſiatic ſtyle, on the contrary, is that which is very diffuſive and prolix, or where abundance of words are uſed to expreſs a little matter.

STYLE, in jurisprudence, the particular form, or manner of proceeding in each court of juriſdiction, agreeable to the rules and orders eſtabliſhed therein: thus we ſay the ſtyle of the court of Rome, of Chancery, of Parliament, of the Privy-council, &c.

STYLE, in muſic, denotes a peculiar manner of ſinging, playing, or compoſing; being properly the manner that each perſon has of playing, ſinging, or teaching; which is very different both in reſpect of different geniuſes, of countries, nations, and of the different matters, places, times, ſubjects, paſſions, expreſſions, &c. Thus we ſay the ſtyle of Paleſtrina, of Lully, of Corelli, of Handel, &c. the ſtyle of the Italians, French, Spaniards, &c. The ſtyle of gay pieces of muſic is very different from that of ſerious ones; and the ſtyle of church muſic is very different from theatrical muſic. The ſtyle of the italian compoſitions is poignant, florid, expreſſive: that of the french compoſitions, natural, flowing, tender, &c. Hence the various epithets given to diſtinguiſh the various characters; as the antient and modern ſtyles; the italian and german ſtyles; the eccleſiaſtical and dramatic ſtyles; the gay, the grave, majeſtic, natural, ſoft, familiar, gallant, low, ſublime ſtyles, &c.

The ſtylo recitativo, or dramatico, in the italian muſic, is a ſtyle fit to expreſs the paſſions: the ſtylo eccleſiaſtico, is full of majeſty, very grave, and fit to inſpire devotion: ſtylo motectico, is a various rich, florid ſtyle, capable of all kinds of ornaments, and of conſequence fit to expreſs various paſſions, particularly admiration, grief, &c. ſtylo madrigaleſco is a ſtyle proper for love, and the other ſofter paſſions: ſtylo hyperchematico is a ſtyle proper to excite joy, mirth, and dancing, and conſequently full of briſk and gay motions: ſtylo ſymphoniaco, is a ſtyle fit for inſtrumental muſic: but as each inſtrument has its peculiar effects, there are as many different ſymphonical ſtyles: the ſtyle of the violin, for inſtance, is uſually gay; that of the flutes, melancholy and languiſhing; that of trumpets, ſprightly and animating: ſtylo meliſmatico is a natural artleſs ſtyle, which any body almoſt may ſing, fit for airs and ballads: ſtylo phantaſtico, is an eaſy humorous manner of compoſition, free from all conſtraints, &c. ſtylo choraico, a ſtyle that is proper for dancing, and is divided into as many different kinds as there are different dances; as the ſtyle of ſarabands, minuets, gavots, jiggs, rigadoons, chacones, &c.

Old-STYLE, the julian manner of computing times, as the

New-STYLE is the gregorian method of computation. See the articles JULIAN, GREGORIAN, BISSEXTILE, &c.

STYLET, or STILETTO, a ſmall dangerous kind of pionard, which may be concealed in the hand, chiefly uſed in treacherous aſſaſſinations. The blade is uſually triangular, and ſo ſlender that the wound it makes is almoſt imperceptible. The ſtylet is prohibited in all well-diſciplined ſtates.

STYLITES, an appellation given to a kind of ſolitaries, who ſpend their lives ſeated on the tops of columns, to be, as they imagine, the better diſpoſed for meditation, &c. Of theſe we find ſeveral mentioned in antient writers, and even as low as the eleventh century. The founder of the order was St. Simon Stylites, a famous anchoret in the fifth century, who took up his abode on a column ſix cubits high; then on a ſecond, of twelve cubits; a third, of twenty-two; and, at laſt, on another of thirty-ſix. The extremity of theſe columns were only three feet in diameter, with a kind of rail or ledge about it that reached almoſt to the girdle, ſomewhat reſembling a pulpit. There was no lying down in it. The faquirs, or devout people of the eaſt, imitate this extraordinary kind of life even to this day.

STYLOGLOSSUS, in anatomy, a muſcle ariſing from the apex of the ſtyloide proceſs; and, deſcending obliquely to the ſide and root of the tongue, moves it ſideways, backwards and forwards.

STYLOHYOIDÆUS, in anatomy, a pair of muſcles ariſing in the ſtyloide proceſs, and terminating in the horn and the baſe: this is often perforated by the digaſtric muſcle of the jaw. Theſe muſcles draw laterally upwards.

STYLOIDES, in anatomy, an apophyſis of the os petroſum, thus called from its reſembling a ſtyle or ſtylet.

STYLOPHARYNGÆUS, in anatomy, one of the ſix pair of muſcles which ſerve to dilate the pharynx. See the article PHARYNX.

The ſtylopharingæus ariſes from the beginning of the ſtyloide proceſs, and is inſerted on both ſides into this and into the thyroide proceſs: it ſerves alſo to elevate as well as dilate the pharynx.

STYPTIC, στυπτικον, in pharmacy, medicines which by their aſtringent qualities ſtop hæmorrhages. See the article HÆMORRHAGE.

When a conſiderable hæmorrhage is ſtopt by abſorbents or ſtyptics, it is always produced by means of a clot of blood, ſecured by compreſſion, ſo that the orifice of the veſſel is ſtopt. This clot generally conſiſts of two parts, the one without, and the other within, the veſſel: that without is formed by the laſt flowing blood, which, in coagulating, incorporates itſelf with the lint, moſs, or powders, uſed for ſtopping the blood: the other part of the clot within the veſſel, is only that portion of the blood which was ready to be diſcharged when the veſſel was ſtopped. Theſe two parts are often but one continued clot. That without the veſſel performs the office of a covering, whilſt that within ſerves as a kind of ſtopper. Alcohol, or pure ſpirit of wine, is the moſt uſual, and perhaps the beſt, ſtyptic; and is the baſis of moſt of the celebrated arcana for ſtopping hæmorrhages. Boerhaave ſays it becomes an immediate ſtyptic, as it prevents putrefaction, and occaſions a thin but very ſolid eſchar. For if pledgits be dipped in pure alcohol, made hot, and applied to a bleeding wound, if it be cloſely compreſſed upon the part, and covered with a piece of bladder lightly beſmeared with oil, and kept on with a proper bandage, the hæmorrhage preſently ceaſes, and the whole dreſſing may continue unremoved for three days, in which time the veſſels are uſually cloſed and ſtrongly contracted and conſolidated, by means of the alcohol.

The ſtyptic powder of Helvetius is a medicine ſaid to be ſerviceable in uterine hæmorrhages, either to correct the too frequent return of the menſes, or their too great abundance; alſo to ſtop the flooding to which women with child are ſubject, and to moderate the flow of the lochia. It is alſo found to have very ſurprizing good effects in the fluor albus. It is a compoſition of alum and dragon's-blood. and in the Edinburgh diſpenſatory, two parts of alum are directed to be made into powder with one of the dragon's-blood: others uſe equal parts of both. Heiſter recommends this powder or alum alone, with a decoction of linſeed.

Eaton's ſtyptic is famous for curing freſh wounds in a very ſmall time, and immediately ſtopping their bleeding: but Dr. Sprengel is ſaid to prove, beyond all poſſibility of doubt, that this is in effect no other than the ſtyptic of Helvetius.

The female agaric has been of late greatly celebrated as a ſtyptic, and is ſaid to reſtrain not only the venal but arterial hæmorrhages, without the uſe of ligatures. See AGARIC, (*appen.*)

STYRAX, STORAX, in botany, a genus of the *icoſandria-monogynia* claſs of plants, the corolla whereof is monopetalous and funnel-ſhaped: the tube is cylindric, and no longer than the cup: the fruit is a roundiſh drupe, having only one cell: the ſeeds are two roundiſh acuminated nuts, convex on one ſide and plane on the other. This tree is a native of ſeveral parts of Europe and of the eaſt: in the latter part of the world it affords the fragrant reſin called ſtyrax, on wounding its trunk: for the virtues, &c. whereof ſee the article STORAX.

SUANA, or SOVANA, a town of Italy, in the dutchy of Tuſcany, and province of Sienna: ſituated on the confines of the dutchy of Caſtro, fifty miles ſouth of Sienna.

SUB, a latin prepoſition, ſignifying *under*, or *below*, frequently uſed in compoſition in our language: thus, 1. Sub-brigadier is an officer in the cavalry who commands under the brigadier, aſſiſting him in the diſcharge of his office. 2. Sub-chantor, an officer in the choir, who officiates in the abſence of the chantor. 3. Sub-deacon, an antient officer in the church that was made by the delivery of an empty platter and cup by the biſhop; and of a pitcher, baſon, and towel by the arch-deacon. His office was to wait on the deacon with the linnen whereon the body, &c. was conſecrated, and to receive and carry away the plate with the offerings at the ſacraments, and the cup with the wine in it, &c. 4. Sub-dean, a dignity in ſome chapters beneath the dean. 5. Sub-marſhal, an officer in the

the Marſhalſea that is deputy to the chief-marſhal of the king's houſe, who is commonly called knight-marſhal, and has the cuſtody of the priſoners there. 6. Sub-prior, a clauſtral officer who aſſiſts the prior, &c. See the articles BRIGADIER, CHANTOR, DEACON, DEAN, &c.

SUBALTERN, a ſubordinate officer, or one who diſcharges his poſt under the command, and ſubject to the direction of another: ſuch are lieutenants, ſub-lieutenants, cornets and enſigns, who ſerve under the captain; but cuſtom has now appropriated the term to thoſe of much lower ranks, as ſerjeants, and the like. We alſo ſay ſubaltern-courts, juriſdictions, &c. ſuch are thoſe of inferior lords, with regard to the lord paramount; hundred courts, with regard to county-courts, &c.

SUBBUTEO, in ornithology, the yellow-legged falco, with the head brown, and the ſhoulders and belly white. See the article FALCO.

SUBCLAVIAN, *ſubclavius*, in anatomy, is applied to any thing under the arm-pit or ſhoulder, whether artery, nerve, vein, or muſcle.

Subclavius more particularly denotes a ſmall oblong muſcle lying between the clavicle and firſt rib. It is fixed by one end in all the middle lower portion of the clavicle, at the diſtance of about an inch from each extremity, and by the other in the cartilage, and a ſmall part of the bone of the firſt rib.

SUBCONTRARY POSITION, in geometry, is when two ſimilar triangles are ſo placed as to have one common angle V, (plate CCLXII. fig. 7.) at the vertex, and yet their baſes not parallel. If the ſcalenous cone, BVD, be ſo cut by the plane CA, as that the angle at C = the angle at D, the cone is then ſaid to be cut ſubcontrarily to its baſe BD.

SUBCOSTAL MUSCLES, *ſubcoſtales*, in anatomy. Theſe muſcles are fleſhy planes of different breadths, and very thin, ſituated more or leſs obliquely on the inſide of the ribs, near their bony angles, and running in the ſame direction with the external intercoſtals. They are fixed by other extremities in the ribs, the inferior extremity being always at a greater diſtance from the vertebræ than the ſuperior, and ſeveral ribs lying between the two inſertions. Theſe muſcles are more ſenſible in the lower ribs than in the upper, and they adhere cloſely to the ribs that lie between their inſertions.

SUBCUTANEOUS, in anatomy, a thin membranous muſcle, running under the ſkin, called alſo quadratus genæ, and platiſma myoides. It ariſes with a pretty broad origin from the hind part of the neck, and from the pectoral muſcle below the clavicle. It adheres firmly to the paniculus carnoſus, from which it is not ſeparated without difficulty, and therefore it was not antiently diſtinguiſhed from it. It is inſerted obliquely on each ſide into the lower jaw-bone, near the ſkin, lips, and ſometimes the bottom of the noſe, all which parts it draws downwards and awry. A convulſion herein is called the cynic ſpaſm. In ſome perſons it reaches to the ears, which is the reaſon that ſome have the faculty of moving their ears which others want.

SUBCUTANEOUS GLANDS, in anatomy. See the article GLAND.

SUBDUCTION, in arithmetic, the ſame as ſubſtraction. See SUBSTRACTION.

SUBDUPLE RATIO, is when any number or quantity is contained in another twice: thus 3 is ſaid to be ſubduple of 6, as 6 is duple of 3.

SUBDUPLICATE RATIO of any two quantities is the ratio of their ſquare roots. See the article RATIO.

SUBER, the CORK-TREE, in botany, a ſpecies of quercus. See OAK.

SUBJECT, *ſubditus*, a perſon under the rule and dominion of a ſovereign prince or ſtate.

SUBJECT, *ſubjectum*, is alſo uſed for the matter of an art or ſcience, or that which it conſiders, or whereon it is employed: thus the human body is the ſubject of medicine. In this ſenſe the anatomiſts call the body they are diſſecting, and whereon they read lectures, their ſubject. The ſubject of logic is thinking or reaſoning; but more particularly in a ſyllogiſm one of the terms of a propoſition is called the ſubject, and the other the attribute. In poetry, the ſubject is the matter treated of, or the event related or ſet to view. Subject alſo denotes the ſubſtance or matter to which an accident is added, whence the maxim that two contraries can never ſubſiſt in the ſame ſubject.

SUBJECT, in the manege. To keep the horſe ſubject, is an expreſſion relating to colts, ſignifying to keep the croupe of the horſe in the round ſo that it may not

ſlip

ſlip out; that he may not traverſe; and that he may work, in the manege, croupe in, marking his equal times, without loſing his ground.

SUBJECT, in muſic. See SOGETTO.

SUBJUNCTIVE, in grammar, the ſecond mood of verbs, thus called becauſe ſubjoined to another verb, or particle at leaſt, and not ſtanding alone in a ſentence: thus *Orat ut ad ſe venias. Quid faciam prorſus ignoro. Though this were true, &c.* See the article MOOD.

SUBLIMABLE BODIES, a term uſed by ſome of our chemical writers to expreſs ſuch ſubſtances as are capable of ſublimation in a dry form. See the article SUBLIMATION.

SUBLIMATE, a chemical preparation, the baſis whereof is mercury or quick-ſilver. There are two kinds of ſublimate, corroſive ſublimate and ſweet ſublimate, or mercurius dulcis ſublimatus, which ſee under MERCURY.

SUBLIMATION, the condenſing and collecting in a ſolid form by means of veſſels aptly conſtructed, the fumes of bodies raiſed from them, by the application of a proper heat. Sublimation is in all reſpects the ſame with diſtillation, except that in the firſt the produce is ſolid, but in the latter fluid. The only variation therefore neceſſary in the operation, is the accommodating the recipient part of the apparatus to this difference, which admits, in moſt caſes, that one veſſel may perform the office both of condenſer and receiver, as the matter cannot, like fluids, flow to another part, but muſt remain where it firſt ſettles, except in ſome inſtances where the matter is extremely volatile, or where a fluid riſing with it renders a depending receiver neceſſary. See DISTILLATION.

The veſſels proper, in reſpect of the different ſubjects of this operation, vary in their ſtructure and the ſubſtance of which they are made, as well on account of the degree of heat requiſite to be employed, as the nature of the matter to be ſublimed, ſince corroſions of them are here, and indeed in all other caſes, to be careſully avoided. In ſublimations of mercury, whether combined with acids or ſulphur, of ſal ammoniacum and of ſulphur alone, a ſingle veſſel may anſwer all the purpoſes, as their neceſſity of a great heat to keep them in the condition of fumes renders the upper part of the glaſs capable of detaining them when they are raiſed thereto; but it is proper, in theſe inſtances, that a glaſs in ſand, or earthen ware, ſhould be uſed. A glaſs body, in a ſtrong ſand heat, may very well ſerve for all theſe; but ſublimate of mercury is frequently ſublimed in a bolt-head, or matraſs; and the factitious cinnabar, by thoſe who make large quantities, in an earthen veſſel made in the ſhape of an egg. In the ſublimation of volatile ſalt of amber, and flowers of benjamin, a container and condenſer are ſeparately neceſſary, and may in all theſe caſes be extremely well ſupplied by a retort and receiver, though bodies with alembic heads, and receivers of glaſs fitted to them, have been generally recommended in ſeveral of them; but the trouble of luting two junctures, and the difficulty of fitting them to each other, with ſeveral other reaſons, make retorts far more convenient. A retort and receiver are likewiſe proper in the caſe of cinnabar of antimony; for though the cinnabar might be reſtrained in one glaſs, the butter of antimony makes the receiver neceſſary.

In ſublimations of factitious cinnabar, mercury ſublimate, and ſal-amoniacum, it is ſufficient to cover the aperture or neck of the veſſel with a tile; and in the ſublimation of cinnabar of antimony, and flowers of Benjamin, in retorts, it is unneceſſary to lute on the receiver; but in the ſublimation of volatile ſalts, it is requiſite to lute the veſſels as ſecure as poſſible, leaving only a ſmall vent till they attain the greateſt heat they are to ſuffer during the operation.

The requiſite degree of heat in ſublimation varies in almoſt every different ſubject of the operation. The limits are from the greateſt degree that can be given in ſand, to a degree ſomething leſs than that which will make water boil. See the article HEAT.

Hoffman obſerves, that only thoſe things are ſublimable which contain a dry exhaleable matter in their original conſtruction, and among theſe is found a great variety, which require various methods and means to execute that effect. Among the minerals, ſulphur, antimony, and orpiment, are named as the principal ſublimable bodies: theſe are of a very lax compage or ſtructure, and eaſily raiſed by fire in ſmall particles, which concrete again on being ſtopt from flying off by the cover of the veſſel; while, on the contrary, iron, ſilver, and the other metals, being of a cloſer ſtructure, remain

main fixed in the greateſt heat, and never aſcend without being mixed with ſome volatile ſubſtance that is of itſelf capable of riſing and taking up ſome of them with it. Thus copper and iron will be raiſed in ſublimation by means of ſal ammoniac mixed with them; and even gold itſelf is ſaid to be ſubject to the ſame law; Mr. Boyle aſſuring us that he had a ſecret method of preparing a certain ſaline ſubſtance, by means of a very ſmall admixture of which, gold would be made to riſe in ſublimation, and form fine purple cryſtals. The admixtures which make bodies ſublimable that are not ſo in themſelves, are to be of various kinds, according to the nature of the body to be ſublimed. Among theſe, ſome act by rendering the body more eaſily fuſible, and diſuniting thoſe particles more readily which the fire is expected to carry up: others act again by preventing the cohefions of the particles of the ſubſtance to be ſublimed, which heat would otherwiſe occaſion: and, finally, others, by entering the body of the fixed ſubſtance they are mixed with, and giving wings, as it were, to its ſubtle particles, ſo that they may aſcend with its eaſily ſublimable matter, and join with it in the formation of one mixed ſubſtance in the top of the veſſel, by partaking of the nature of both. Others act potentially in the ſame way, but by different means, themſelves not being capable of ſublimation, but acting on the ſubſtance to be ſublimed, by enervating, weakening, or abſorbing thoſe ſubſtances, or parts, of the mixed body, which would otherwiſe have prevented the aſcent of the reſt: and, finally, ſome act as diſſolvents only, and by that means render things eaſy of ſublimation, which would have been very difficultly ſo, while their parts were in a more ſtrict continuity.

SUBLIME, in diſcourſe, is defined by Boileau, to be ſomething extraordinary and ſurpriſing, which ſtrikes the ſoul, and makes a ſentiment or compoſition raviſh and tranſport.

From this definition it appears, that the ſublime is a very different thing from what the orators call the ſublime ſtyle. The ſublime ſtyle neceſſarily requires big and magnificent words; but the ſublime may be found in a ſingle thought, a ſingle figure, a ſingle turn of words. A thing may be in the ſublime ſtyle and yet not be ſublime; that is, it may have nothing extraordinary and ſurprizing. See the article STYLE.

Longinus makes five ſources of the ſublime: the firſt, a certain elevation of the mind, which makes us think happily: the ſecond is the pathetic, or that natural vehemence and enthuſiaſm which ſtrikes and moves us; theſe two are wholly owing to nature, and muſt be born with us; whereas the reſt depend partly on art: the third is the turning of figures in a certain manner, both thoſe of thoughts and of ſpeech: the fourth, nobleneſs of expreſſion; which conſiſts of two parts, the choice of words, and the elegant figurative diction: the fifth, which includes all the reſt, is the compoſition and arrangement of the words in all their magnificence and dignity.

SUBLINGUAL GLANDS, in anatomy, two glands under the tongue, placed one on each ſide thereof. Theſe, called alſo hypoglottides, filtrate a ſerous humour of the nature of ſaliva, which they diſcharge by little ducts near the gums into the mouth. See GLAND.

SUBMULTIPLE, in geometry, *&c.* A ſubmultiple number, or quantity, is that which is contained a certain number of times in another, and which, therefore, repeated a certain number of times, becomes exactly equal thereto: thus 3 is a ſubmultiple of 21; in which ſenſe ſubmultiple coincides with an aliquot part. See the article ALIQUOT PART.

SUBMULTIPLE RATIO, is that between the quantity contained and the quantity containing: thus the ratio of 3 to 21 is ſubmultiple. In both caſes ſubmultiple is the reverſe of multiple, 21, *e.g.* being a multiple of 3, and the ratio of 21 to 3 a multiple ratio. See the article RATIO.

SUBNORMAL, in geometry, a line which determines the point in the axis of a curve, where a normal, or perpendicular, raiſed from the point of contact of a tangent to the curve, cuts the axis. Or the ſubnormal is a line which determines the point wherein the axis is cut by a line falling perpendicularly on the tangent in the point of the contact: thus TM (plate CCLXII. fig. 6.) being a tangent to a curve in M, and MR a normal or perpendicular to the tangent, the line PR intercepted between the ſemiordinate PM, and the normal MR, is called the ſubnormal. Hence in a parabola as AM, *&c.* the ſubnormal PR is

to the ſemi-ordinate PM, as PM is to PT, and MR to TM. 2. In the parabola the ſubnormal PR is ſubduple the parameter, and, conſequently, an invariable quantity.

SUBORDINATION, a relative term, expreſſing the degree of inferiority between one thing and another.

SUBORNATION, a ſecret or under-hand preparing, inſtructing, or bringing in a falſe witneſs; or corrupting or alluring a perſon to do ſuch a falſe act. Hence, ſubornation of perjury is a corrupting or inticing a perſon to perjury. See the article PERJURY.

Perſons ſuborning a witneſs to give falſe evidence, are liable to 40l. forfeiture, or to be impriſoned for half a year, ſtand on the pillory, &c.

SUBPOENA, in law, a writ whereby all common perſons, or thoſe under the degree of peerage, may be called into chancery, in any caſe where the law cannot afford a remedy. The peers, in like caſes are called by the lord chancellor's letters, giving notice of the ſuit intended againſt them, and requiring them to appear. There are divers ſorts of theſe writs in the court of chancery, as the ſubpœna ad reſpondendum, to anſwer; ſubpœna ad replicandum, to reply; ſubpœna ad teſtificandum, to give evidence; and the ſubpœna ad audiendum judicium, &c. It is here to be obſerved, that a ſubpœna ad teſtificandum, lies for the bringing in of witneſſes, to give their evidence in a cauſe, not only in the court of chancery, but in all other courts. The ſubpœna to anſwer, is the leading proceſs in courts of equity; and by ſtatute, when a bill is filed againſt a perſon, this ſubpœna may be taken out, which muſt be ſerved perſonally on the defendant, or left at his houſe, with one of his family; on affidavit made whereof, if any ſuch defendant does not appear and anſwer the bill, an attachment ſhall iſſue againſt him. A writ of ſubpœna takes its name from the words thereof, which charge the party ſummoned to appear at the day and place aſſigned, *ſub pœna centum librorum*, on the penalty of 100l. which is inſerted in terrorem, it being never levied.

SUBREPTION, *ſubreptio*, the act of obtaining a favour from a ſuperior, by ſurpriſe, or a falſe repreſentation. See the next article.

SUBREPTITIOUS, or SURREPTITIOUS, a term applied to a letter, licence, patent, or other act, fraudulently obtained of a ſuperior, by concealing ſome truth, which, had it been known, would have prevented the conceſſion or grant; in which caſe, the benefits of letters, licences, &c. are forfeited.

SUBROGATION, or SURROGATION, in the civil law, the act of ſubſtituting a perſon in the place, and entitling him to the rights, of another: but, in its general ſenſe, ſubrogation implies a ſucceſſion of any kind, whether of a perſon to a perſon, or of a perſon to a thing. There are two kinds of ſubrogation, the one conventional, the other legal. Conventional ſubrogation is a contract, whereby a creditor transfers his debt, with all appurtenances thereof, to the profit of a third perſon. Legal ſubrogation is that which the law makes, in favour of a perſon who diſcharges an antecedent creditor, in which caſe there is a legal tranſlation of all rights of the antient creditor to the perſon of the new one. This the civilians more uſually call ſucceſſion, as being wholly the work of the law; and to diſtinguiſh it from the conventional ſubrogation, which they alſo call ceſſion.

SUBSCAPULARIS, in anatomy, a muſcle ariſing from the baſis and ſide of the ſcapula, and, ſpreading itſelf under the whole convex or under-ſide of it, is inſerted by a ſemi-circular tendon, into the neck of the os humeri, and draws it down to the ſide of the trunk. See SCAPULA.

SUBSCRIPTION, in general, ſignifies the ſignature put at the bottom of a letter, writing, or inſtrument.

In commerce, it is uſed for the ſhare or intereſt, which particular perſons take in a public ſtock, or a trading company, by writing their names, and the ſhares they require, in the books or regiſter thereof.

Subſcription, in the commerce of books, ſignifies an engagement to take a certain number of copies of a book intended to be printed, and a reciprocal obligation of the bookſeller, or publiſher, to deliver the ſaid copies, on certain terms. The uſual conditions of theſe ſubſcriptions are, on the part of the bookſeller, to afford the books cheaper to a ſubſcriber than to another, by one third or one fourth, of the price; and, on the part of the latter, to advance half the money in hand, and to pay the reſt on the delivery of the copies. Theſe ſubſcriptions, which had their riſe in England, about the middle of the laſt century,

century, are now become frequent in France and Holland, but exceedingly more ſo among ourſelves of late: and it is not without foundation complained, that their frequency has rendered them liable to ſome abuſes, which ſeem very much to diſcredit them.

SUBSEQUENT, ſomething that comes after another, particularly with regard to the order of time.

SUBSIDY, in law, ſignifies an aid or tax granted to the king, by parliament, for the neceſſary occaſions of the kingdom; and is to be levied on every ſubject of ability, according to the rate or value of his lands or goods: but this word, in ſome of our ſtatutes, is confounded with that of cuſtoms.

SUBSISTENCE, in the military art, is the money paid to the ſoldiers weekly, not amounting to their full pay; becauſe their cloaths, accoutrements, tents, bread, &c. are to be paid. It is likewiſe the money paid to officers upon account, till their accounts be made up, which is generally once a year, and then they are paid their arrears.

SUBSTANCE, *ſubſtantia*, ſomething that we conceive to ſubſiſt of itſelf, independently of any created being, or any particular mode or accident. See MODE.

Our ideas of ſubſtances, Mr. Locke obſerves, are only ſuch combinations of ſimple ideas, as are taken to repreſent diſtinct things ſubſiſting by themſelves, in which the confuſed idea of ſubſtance is always the chief. Thus the combination of the ideas of a certain figure, with the powers of motion, thought, and reaſoning joined to the ſubſtance, make the ordinary idea of a man: and thus the mind obſerving ſeveral ſimple ideas to go conſtantly together, which being preſumed to belong to one thing, or to be united in one ſubject, are called by one name, which we are apt afterwards to talk of, and conſider, as one ſimple idea. See the article IDEA.

We imagine theſe ſimple ideas do not ſubſiſt by themſelves, but ſuppoſe ſome ſubſtratum wherein they ſubſiſt, which we call ſubſtance. The idea of pure ſubſtances is nothing but the ſuppoſed, yet unknown ſupport of theſe qualities, which are capable of producing ſimple ideas in us. The ideas of particular ſubſtances are compoſed out of this obſcure and general idea of ſubſtance, together with ſuch combinations of ſimple ideas, as are obſerved to exiſt together, and ſuppoſed to flow from the internal conſtitution and unknown eſſence of that ſubſtance. Thus we come by the ideas of man, horſe, gold, &c. Thus the ſenſible qualities of iron, or a diamond, make the complex ideas of thoſe ſubſtances, which a ſmith, or a jeweller, commonly knows better than a philoſopher. The ſame happens concerning the operations of the mind, *viz.* thinking, reaſoning, &c. which we concluding not to ſubſiſt by themſelves, nor comprehending how they can belong to body, or be produced by it, we think them the actions of ſome other ſubſtance, which we call ſpirit, of whoſe ſubſtance or nature we have as clear a notion as of that of body, the one being but the ſuppoſed ſubſtratum of the ſimple ideas we have from without, as the other of thoſe operations which we experiment in ourſelves within; ſo that the idea of corporeal ſubſtance in matter, is as remote from our conceptions, as that of ſpiritual ſubſtance. See the articles ESSENCE and EXISTENCE.

Hence we may conclude, that he has the moſt perfect idea of any particular ſubſtance, who has collected moſt of thoſe ſimple ideas which do exiſt in it, among which we are to reckon its active powers and paſſive capacities, though not ſtrictly ſimple ideas.

Subſtances are generally diſtinguiſhed by ſecondary qualities, for our ſenſes fail us in the diſcovery of primary ones, as the bulk, figure, texture, &c. of the minute parts of bodies, on which their real conſtitutions and differences depend; and ſecondary qualities are nothing but powers with relation to our ſenſes. The ideas that make our complex ones of corporeal ſubſtances, are of three ſorts: firſt, the ideas of primary qualities of things, which are diſcovered by our ſenſes; ſuch are bulk, figure, motion, &c. Secondly, the ſenſible ſecondary qualities, which are nothing but powers to produce ſeveral ideas in us, by our ſenſes. Thirdly, the aptneſs we conſider in ſubſtance, to cauſe or receive ſuch alterations of primary qualities, as that the ſubſtance ſo altered, ſhould produce in us different ideas from what it did before; and they are called active and paſſive powers: all which, as far as we have any notice or notion of them, terminate in ſimple ideas. See the article QUALITIES.

Beſides the complex ideas we have of material ſubſtances, by the ſimple ideas taken from the operations of our own minds,

which we experiment in ourſelves, as thinking, underſtanding, willing, knowing, &c. co-exiſting in the ſame ſubſtance, we are able to frame the complex idea of a ſpirit; and this idea of an immaterial ſubſtance is as clear as that we have of a material one. By joining theſe with ſubſtance, of which we have no diſtinct idea, we have the idea of ſpirit; and by putting together the ideas of coherent, ſolid parts, and a power of being moved, joined with ſubſtance, of which likewiſe we have no poſitive idea, we have the idea of matter. See MATTER and and SPIRIT.

Further, there are other ideas of ſubſtances, which may be called collective; which are made up of many particular ſubſtances conſidered as united into one idea, as a troop, army, &c. which the mind makes by its power of compoſition. Theſe collective ideas are but the artificial draughts of the mind, bringing things, remote and independent, into one view, the better to contemplate and diſcourſe of them united into one conception, and ſignified by one name: for there are no things ſo remote, which the mind cannot, by this art of compoſition, bring into one idea; as is viſible in that ſignified by the name univerſe. See COMPOSITION.

SUBSTANTIAL, in the ſchools, ſomething belonging to the nature of ſubſtance.

It is generally diſputed, whether or no there be ſuch things as ſubſtantial forms? *i. e.* forms independent of all matter; or forms that are ſubſtances themſelves.

Subſtantial is alſo uſed in the ſame ſenſe with eſſential, in oppoſition to accidental.

SUBSTANTIVE, in grammar, a noun, or name, conſidered ſimply and in itſelf, without any regard to its qualities, or other accidents, in contradiſtinction to the noun termed adjective, or that which expreſſes a certain quality or accident of the noun ſubſtantive. Or, a noun ſubſtantive is that noun, which, joined to a verb, makes a perfect ſentence, as *a man, a horſe, a tree*; thus, *a man laughs, a horſe gallops, a tree buds*, are each of them perfect ſentences. All nouns, to which one cannot add the word *thing*, are ſubſtantives; and thoſe to which *thing* may be added, are adjectives. See the articles NOUN, ADJECTIVE, and VERB. Subſtantives are divided into proper and appellative. See the articles PROPER and APPELLATIVE.

SUBSTANTIVE VERB. See VERB.

SUBSTITUTE, a perſon appointed to officiate for another, in caſe of abſence, or other legal impediment.

SUBSTITUTE, in medicine, denotes a drug or remedy that may be uſed inſtead of another; or that ſupplies the place of another, of like virtue, which is not perhaps to be had: called alſo ſuccedaneum.

SUBSTITUTION, in grammar, the uſing one word for another. This the grammarians otherwiſe call ſyllepſis.

SUBSTITUTION, in the civil-law, a diſpoſition of a teſtament, whereby the teſtator ſubſtitutes one heir for another, who has only the uſufruit, and not the property of the thing left him. Subſtitution is only a kind of fiduciary inheritance, called alſo fidei commiſſio, in regard the immediate inheritor has only the uſe or produce of the thing; the body thereof being ſubſtituted and appropriated to certain perſons, who are likewiſe to have the uſufruit in their turns, but are never to have the property.

SUBSTITUTION, in algebra, &c. is the putting, in the room of any quantity in an equation, ſome other quantity, which is equal to it, but expreſſed in another manner.

SUBSTRACTION, or SUBTRACTION, in arithmetic, the ſecond rule, or rather operation, in arithmetic, whereby we deduct a leſs number from a greater, to learn their preciſe difference.

Prob. I. To ſubſtract integers of like names, when the minuend, or number to be ſubſtracted from, is greater than, or equal to, the ſubducend, or that which is ſubſtracted.

Rule 1. Place the ſubducend under the minuend, and draw a line under both. 2. Begin at the right hand; take the leſs from the greater, or equals from equals, and ſet the difference of each row underneath.

Example in integers alone.

Minuend	638
Subducend	213
Remainder	425

The manner of operation.

3, 1, 2 } from { 8, 3, 6 } and there remain { 5, 2, 4 } which ſet below.

That is, 3, 10, 200 } from { 8, 30, 600 } remainder is { 5, 20, 400

Therefore 213 { 638 } 425

For

For ſince the whole is equal to the ſum of all its parts, therefore the ſubſtraction of all its parts is the ſame with the ſubſtraction of the whole.

Examples in integers and parts.

Minuend	27°	48′	36″
Subducend	12	31	24
Remainder	15	17	12

Minuend	146l.	18s.	6d.
Subducend	22	8	2
	124	10	4

Prob. II. To ſubſtract integers of the ſame name or denomination, when ſome of the minuend numbers are leſs than their inferior in the ſubducend.

Rule 1. Place your numbers, and begin as before. 2. According to their reſpective value, take one of the next denomination, out of which ſubſtract, and to the remainder add the minuend, ſeting their ſum underneath. 3. Then add what you took, to the next place, on the left hand, and ſo proceed by this, or the former rule.

Example in integers alone.

From	2537
Subſtract	1648
Remainder	889

The manner of operation.

8 } from { 17 } remain { 9 } which
1 and 4 = 5 { 13 { 8 } ſet be-
1 and 6 = 7 { 15 { 8 } low.

That is 8 } from { 7+ 10 } remain { 9
10+ 40 { 30+ 100 { 80
100+ 600 { 500+1000 { 800
1000+1000 { 2000+0000 { 0000
therefr. 1648 } { 2537 } { 889

For by ſaying 8 from 17, I add 10 to the minuend; but I add alſo the ſame to the ſubducend, by ſaying 1 and 4 = 5, therefore the remainder muſt be the ſame.

The operation alſo may be thus:

8 } from { 17 } remain { 9 units,
4 { 13—1 { 8 tens,
6 { 15—1 { 8 hundreds.
1 { 2—1 { 0

That is 8 } from { 7+ 10 } remain { 9
40 { 30+ 100— 10 { 80
600 { 500+1000— 100 { 800
1000 { 2000+0000—1000 { 0000
Therefore 1648 } { 2537 } { 889

For by adding a ten to the units, and taking it away from the tens, the value of the number is not changed.

Examples in integers and parts.

	s.	d.		s.	d.		s.	d.
From	5	3	i.e.	5	15	or	4	15
Subſt.	2	9		3	9		2	9
Rem.	2	6	=	2	6	=	2	6

	l.	s.	d.		l.	s.	d.
From	246	3	4	i.e.	246	23	16
Subſt.	68	10	6		69	11	6
Rem.	177	12	10	=	177	12	10

or

From	245l.	22s.	16d.
Subſtract	68	10	6
Remains	177	12	10

Theorem. In ſubſtraction, the ſubducend together with the remainder, is equal to the minuend.

For all the parts taken together are equal to the whole. And if the ſubducend be taken from the minuend, there reſts the remainder. But if a part be taken from the whole, the remainder will be the other part: therefore the ſubducend, together with the remainder, are all the parts of the minuend, and conſequently equal to it.

Corollary. Hence addition and ſubſtraction ſerve reciprocally to prove each other. See the article ADDITION.

For addition and ſubſtraction are oppoſite in all caſes; and what is done by the one, is undone by the other.

Thus, if to	6	And if from	10
be added	4	be ſubſtracted	4
Sum is	10	Remainder is	6

That is, if 6+4=10, then 10—4=6.

SUBSTRACTION, in algebra, is performed by the following general rule.

Change the ſigns of the quantity to be ſubſtracted, into their contrary ſigns, and then add it, ſo changed, to the quantity from which it was to be ſubſtracted, by the rules of addition: the ſum ariſing by this addition, is the remainder.

For to ſubſtract any quantity, either poſitive or negative, is the ſame as to add the oppoſite kind. See ADDITION.

Examples.

From	$+5a$	$8a-7b$
Subſt.	$+3a$	$3a+4b$
Rem.	$5a-3a$, or $2a$	$5a-11b$

From $2a-3x+5y-6$
Subſtract $6a+4x+5y+4$
Rem. $-4a-7x \quad 0-10$

It is evident, that to ſubſtract, or take away a decrement is the ſame thing as adding an equal increment. If we take away $-b$ from $a-b$, there remains a; and if we add $+b$ to $a-b$, the ſum is likewiſe a. In general, the ſubſtraction of a negative quantity is equivalent to adding its poſitive value. See the articles QUANTITY, CHARACTER, *&c.*

SUBSTYLAR LINE, in dialling, the line whereon the ſtyle, or gnomon, of a dial is duly erected. See the articles DIAL and LINE.

SUBTANGENT *of a curve*, in the higher geometry, is the line T P (pl. CCLXII. fig. 3. n° 1.) which determines the interſection of the tangent T M, with the axis; or, that determines the point wherein the tangent cuts the axis prolonged. See the article CURVE.

In any equation, if the value of the ſubtangent comes out poſitive, it is a ſign that the points of interſection of the tangent and axis fall on that ſide of the ordinate where the vertex of the curve lies, as in the parabola and paraboloids: but if it comes out negative, the point of interſection will fall on the contrary ſide of the ordinate, in reſpect of the vertex, or beginning of the abſciſſa; as in the hyperbola and hyperboliform figures. And univerſally, in all hyperboliform and hyperboliform figures, the ſubtangent is equal to the exponent of the power of the ordinate, multiplied into the abſciſſa.

If C B (*ibid.* n° 2.) be an ordinate to A B, in any given angle, terminating in any curve A C, and A B $=x$, B C $=y$, and the relation between x and y, that is, the nature of the curve, be expreſſed by this equation, $x^3-2xxy+bxx-bbx+byy-y^3=0$; then this will be the rule of drawing a tangent to it: multiply the terms of the equation by an arithmetical progreſſion, ſuppoſe, according to the dimenſions of y,

$x^3-2xxy+bxx-bbx+byy-y^3$; as
0 1 0 0 2 3

alſo according to the dimenſions of x, as, $x^3-2xxy+bxx-bbx+byy-y^3$;
3 2 2 1 0 0

the former product ſhall be the numerator, and the latter, divided by x, the denominator of a fraction expreſſing the length of the ſubtangent B D, which, in this caſe, will be

$$=\frac{-2xxy+2byy-3y^3}{3xx-4xy+2bx-bb}.$$

SUBTENSE, in geometry, the ſame with the chord of an arch. See CHORD. Hence, the ſubtenſe of an angle is a right line ſuppoſed to be drawn between the two extremities of the arch that meaſures that angle.

SUBTERRANEOUS, or SUBTERRANEAN, appellations given to whatever is under-ground: thus, naturaliſts ſpeak of ſubterraneous fires, damps, *&c.* See the articles VULCANO, DAMP, *&c.* Subterraneous bodies are more uſually called foſſils and minerals. See the articles FOSSILS and MINERALS.

SUBTILE, in phyſics, an appellation given to whatever is extremely ſmall, fine, and delicate; ſuch as the animal ſpirits, the effluvia of odorous bodies, *&c.* are ſuppoſed to be. See the articles ANIMAL SPIRITS, EFFLUVIA, *&c.*

Materia SUBTILIS, among the carteſians. See the article MATERIA.

SUBTRIPLE RATIO, is when one number, or quantity, is contained in another three times: thus, 2 is ſaid to be ſubtriple of 6, as 6 is triple of 2.

SUBULARIA, in botany, a genus of the *tetradynamia-ſiliculoſa* claſs of plants, with a tetralous cruciform flower; its fruit is a ſmall unilocular pod, of an obverſely cordate figure, containing a few, very ſmall and roundiſh ſeeds.

SUBULATED, ſomething in the ſhape of an awl: thus, a ſubulated leaf is one of an oblong and narrow figure, broadeſt at the baſe, and thence gradually decreaſing, till it terminates in a point.

SUCCEDANEUM, in pharmacy, denotes a drug ſubſtituted in the place of another, in medical compoſition. See the article MEDICINE and SUBSTITUTE.

SUCCENTURIATI RENES, in anatomy, the ſame with the capſulæ atrabiliariæ. See the article CAPSULÆ.

SUCCESSION, *ſucceſſio*, in philoſophy, an idea which we get by reflecting on that train of ideas conſtantly following one another in our minds, when awake. See the article IDEA.

SUCCESSION, in law, implies a right to the whole effects left by a defunct.

SUCESSOR,

Fig. 1. The STARLING Cock *and* Hen.

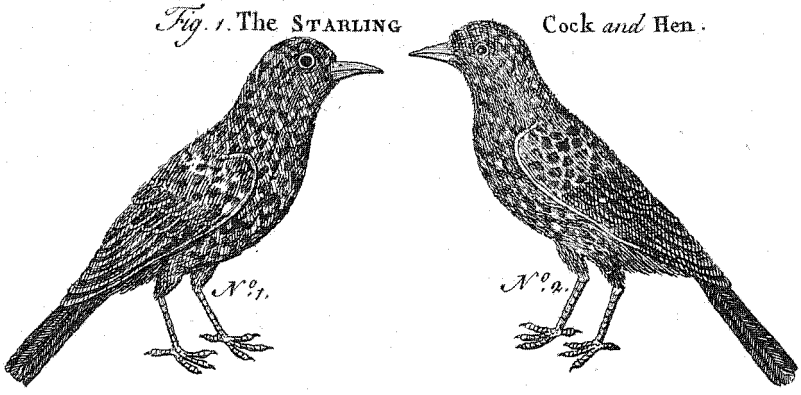


Fig. 2. STRABISMUS.

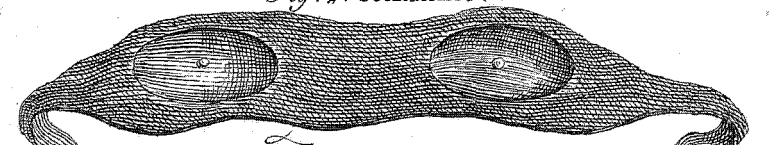


Fig. 3. SUBTANGENT.

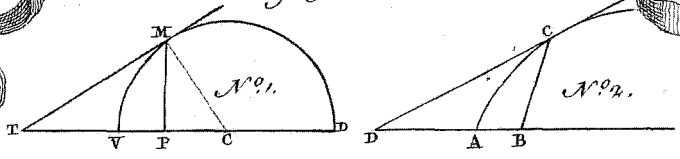


Fig. 4. The STURGEON.

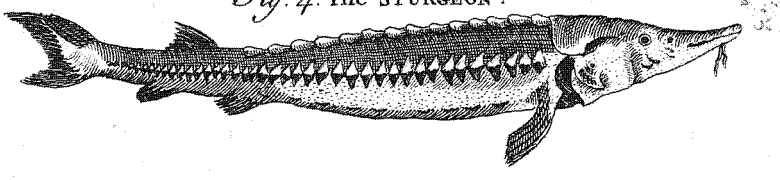
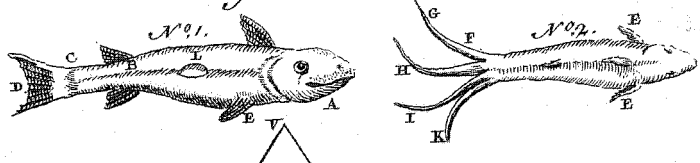


Fig. 5. SWIMMING.



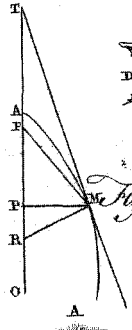


Fig. 6. SUBNORMAL.

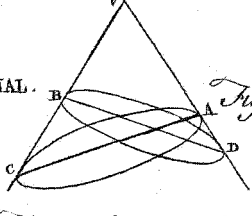
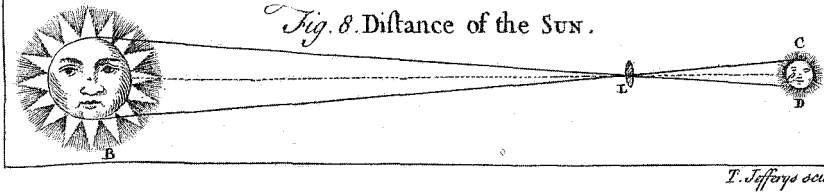


Fig. 7. SUBCONTRARY POSITION.

Fig. 8. Distance of the SUN.



T. Jefferys sculp.

SUCCESSOR, in law, one that ſucceeds, or comes in the place of, another.

It is held, that a ſole corporation may take an eſtate in fee to them and their ſucceſſors, but not without the word *ſucceſſors*: whereas an aggregate corporation may take a fee in ſucceſſion, without expreſſing the word *ſucceſſors*; and likewiſe may have goods and chattels in ſucceſſion. See the article CORPORATION.

SUCCINUM, AMBER, in natural hiſtory. See the article AMBER.

SUCCISA, in botany and pharmacy, a ſpecies of ſcabioſa, called by ſome morſus diaboli, devil's bit; and ſaid to be alexipharmic, but is little uſed in the preſent practice.

SUCCORY, *cichorium*, in botany, *&c.* See the article CICHORIUM.

SUCCOTRINE ALOES. See ALOES.

SUCCUBUS, a term uſed by ſome imaginary writers, for a dæmon who aſſumes the ſhape of a woman, and as ſuch lies with a man; in which ſenſe it ſtands oppoſed to incubus, which was a dæmon in form of a man, that they ſuppoſed to lie with a woman.

But the truth is, the ſuccubus is only a ſpecies of the incubus, or night-mare. See the article INCUBUS.

SUCCULA, in mechanics, a bare axis, or cylinder, with ſtaves to move it round; but without any tympanum or peritrochium.

SUCCULENT PLANTS, thoſe whoſe leaves are thick, and abound with juice. See the article PLANT.

SUCCUS, JUICE, in pharmacy. See the article JUICE.

SUCHUEN, a province of China, bounded by that of Xenſi on the north, by Honam and Huquam on the eaſt, by Quecheu and Yunam on the ſouth, and by the mountains of India on the weſt: its chief town is Chingtu.

SUCK-FISH, *remora*, in ichthyology. See the article REMORA.

SUCKERS, in gardening, the ſame with off-ſets. See the article OFF-SETS.

SUCKING-PUMP. See PUMP.

SUCTION, *ſuctio*, the act of ſucking or drawing up a fluid, as air, water, milk, or the like, by means of the mouth and lungs.

There are many effects vulgarly attributed to ſuction, which, in reality, have very different cauſes. As when any one ſucks water, or any other liquor, up thro' a pipe, it is commonly thought, that by that action the perſon draws the air up into his mouth, and that the water, which is contiguous to it, follows it by a kind of attraction, as if the air and water hung together; and others fancy, that the air moves into the mouth of the ſucker, and the water moves up after the air, to prevent a vacuum, which, they ſay, nature abhors: whereas the true cauſe of this phænomenon is only, that the air and atmoſphere preſſes, with its whole weight, uniformly on the ſurface of the liquor in the veſſel; and, conſequently, prevents any one part of the water to riſe higher than the other there: and if a pipe be put in, of any tolerable large bore, and be open at both ends, the water will riſe within the pipe to the ſame height as without, and, indeed, a little higher, becauſe the preſſure of the air within the pipe is a little taken off by bearing againſt the ſides of the pipe. Now when any one applies his mouth to the upper end of the pipe, and ſucks, his lips ſo ſtrongly incloſe the pipe, that no air can get between them and it; and, by the voluntary motion of the ſpirits in the muſcles, the cavity of his thorax, or breaſt, is opened and enlarged; by which means the air, included there, hath now a much larger ſpace to dilate itſelf in, and, conſequently, cannot preſs ſo ſtrongly againſt the upper end of the pipe, as it did before the cavity of the thorax was ſo enlarged, and when the weight of the whole atmoſphere kept its ſpring bent. And that weight or preſſure being now taken off by the lips of the man that ſucks, the equilibrium is deſtroyed, the air gravitates on the ſurface of the water, but cannot do ſo on the upper orifice of the pipe, becauſe the juncture of the lips takes it off; and the ſpring of the air included in the thorax, being weakened by the dilatation of its cavity, it cannot preſs ſo hard againſt the upper orifice of the pipe, as the water will do againſt the lower, and, conſequently, the water muſt be forced up into the pipe. It is much the ſame thing in the ſuction of a common pump: the ſucker being tight, takes off entirely the preſſure of the atmoſphere on the ſurface of the water within the barrel of the pump; and, conſequently, the atmoſphere, by its weight, muſt force the water up to make the equilibrium.

SUCULA, or SUCCULA. See SUCCULA.

SUDAMINA, little heat pimples in the ſkin, like the millet-grains, frequent in youth, eſpecially thoſe of a hot temperament, and that uſe much exerciſe.

SUDATORY,

SUDATORY, *ſudatorium*, a name given by the antient Romans to their hot or ſweating-rooms; ſometimes alſo called laconica. See the article BATH.

SUDBURY, a borough-town of Suffolk, thirteen miles ſouth of Bury.

It ſends two members to parliament.

SUDER-KOPING, a town of Sweden, in the province of Gothland, ninety miles ſouth-weſt of Stockholm.

SUDOR, SWEAT, in phyſiology. See the article SWEAT.

SUDOR ANGLICANUS, the SWEATING-SICKNESS, a diſeaſe ſo called from its appearing firſt in England, in the year 1483.

It ſeized different patients in different manners; for in ſome it firſt appeared with a pain in the neck, ſcapula, legs, or arms; whilſt others perceived only a kind of warm vapour, or flatulence, running through thoſe parts. And theſe ſymptoms were ſuddenly ſucceeded by a profuſe ſweat, which the patient could not account for. The internal parts became firſt warm, and were ſoon after ſeized with an incredible heat, which thence diffuſed itſelf to the extremities of the body. An intolerable thirſt, reſtleſſneſs, and indiſpoſition of the heart, liver, and ſtomamach, were the next ſymptoms, which were ſucceeded by an exceſſive head-ach, a delirium, in which the patient was very trifling and talkative; and after theſe, a kind of extenuation of the body, and an irreſiſtable neceſſity of ſleeping.

For preventing this diſeaſe, temperance is ordered, and the choice of ſalutary aliments and drinks. No crude pot-herbs nor ſallads are to be uſed, becauſe they may have received a noxious quality from the air; or, if they are uſed, they are to be previouſly waſhed with warm water.

SUDORIFIC, in pharmacy, an appellation given to any medicine that cauſes or promotes ſweat. See SWEAT.

Sudorific, perſpirative, and alexipharmic medicines, ſays Dr. Shaw, make a large part of the common diſpenſatories. A few medicines well choſen, might ſupply the place of all theſe; and of theſe, the principal one would prove to be camphor, which trial will always ſhew to be greatly ſuperior to bezoar, Gaſcoign's powder, lapis contrayerva, and the like. The ſame gentleman gives the following eaſy method of preparing a ſafe and effectual ſudorific: take an ounce of refined camphor, beat it in a marble mortar, with two ounces of blanched almonds, till it be reduced to a ſmooth and even paſte. This may be formed into pills, or boluſes, and given, according to the ſtrength of the patient, and other conſiderations, from three grains to forty.

SUET, *ſevum*, or *ſebum*, in anatomy, the ſolid fat found in ſeveral animals, as ſheep, oxen, &c. but not in the human ſpecies. See the article FAT.

It is of the ſevum that tallow is made. See the article TALLOW.

SUEZ, a port-town of Egypt, ſituated at the bottom of the Red ſea, ſeventy miles eaſt of Cairo: it is from this town that the iſthmus of Suez, which joins Africa to Aſia, takes its name.

SUFFERANCE, or *Bill of* SUFFERANCE. See the article BILL.

SUFFITUS, in medicine, the ſame with fumigation. See FUMIGATION.

SUFFOCATION, in medicine, the privation of reſpiration, or breathing; which is ſometimes occaſioned by a congeſtion of blood in the lungs, ſo as to prevent the ingreſs of the air. See ASTHMA, QUINZY, CATARRH, &c.

The fumes of wine, or other ſtrong liquors, when boiling, likewiſe cauſe ſuffocation; as do the fumes of lime, charcoal, antimony, ſulphur, vitriol, ſpirit of nitre, &c.

SUFFOCATION *of the womb*, or *matrix*, is a diſeaſe pretty frequent in women, called alſo fits of the mother. See the article HYSTERIC.

In this the patient imagines a malignant vapour riſing from the matrix, and ſo preſſing againſt the lungs and diaphragm, as to prevent the free motion neceſſary to reſpiration.

SUFFOCATIVE CATARRH. See the article CATARRH.

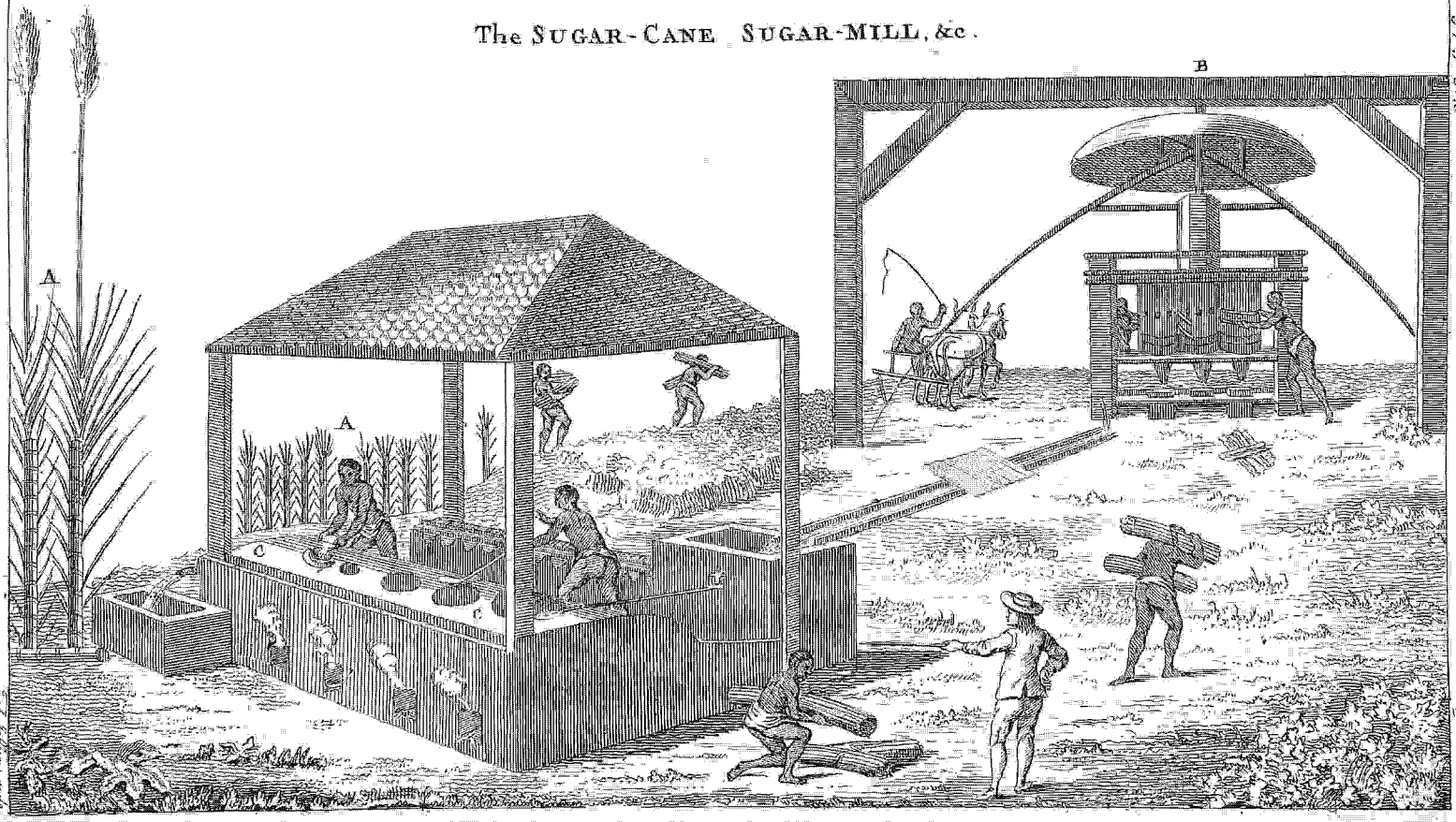
SUFFOLK, a county of England, bounded by Norfolk on the north, by the German ſea on the eaſt, by Eſſex, from which it is ſeparated by the river Maningtree, on the ſouth, and by Cambridgeſhire on the weſt; being ſixty-two miles long, and twenty-eight broad.

SUFFRAGAN, an appellation given to ſimple biſhops, with reſpect to archbiſhops, on whom they depend, and to whom appeals lie from the biſhop's courts. See the articles ARCHBISHOP, BISHOP, COURT, &c.

Sometimes, indeed, the term ſuffragan ſignifies a co adjutor, or aſſiſtant-biſhop.

SUFFRAGE,

The SUGAR-CANE SUGAR-MILL, &c.



SUFFRAGE, *suffragium*, denotes a vote given in an aſſembly, where ſomething is deliberated on, or where a perſon is elected to an office or benefice.

SUFFRUTEX, among botaniſts, denotes an under-ſhrub, or the loweſt kind of woody plants, as lavender, rue, *&c.*

SUFFUMIGATION, or FUMIGATION, See the article FUMIGATION.

SUFFUSION, in medicine, the ſame with a cataract. See CATARACT.

SUGAR, *ſaccharum*, in natural hiſtory, is properly the eſſential ſalt of the ſugar cane, as tartar is of the grape.

The ſugar-cane is a genus of the *triandria-digynia* claſs of plants, the corolla whereof is compoſed of two valves, equal in ſize, and without awns; they are of a lanceolated figure, hollowed, erect, and acuminated: there is no pericarpium; every flower containing within it a ſingle, oblong, and acuminated ſeed.

This plant riſes to eight, nine, or more feet high; the ſtalk, or cane, being round, jointed, and two or three inches in diameter at the bottom: the joints are three or four inches aſunder, and in a rich ſoil more: the leaves are long and narrow, and of a yelloviſh green colour; as is alſo the ſtalk itſelf, the top of which is ornamented with a panicle, or cluſter of of arundinaceous flowers, two or three feet in length. It grows ſpontaneouſly in many parts of the Eaſt-indies, in the Canary-iſlands, and in the warmer climates of America. See plate CCLXIII. letters A, A.

They propagate the ſugar-cane, by planting cuttings of it in the ground in furrows, dug parallel for that purpoſe; the cuttings are laid level and even, and are covered up with earth; they ſoon ſhoot out new plants from their knots or joints; the ground is to be kept clear, at times, from weeds, and the canes grow ſo quick, that in eight, ten, or twelve months, they are fit to cut for making of ſugar from them. The manner of doing it is thus: they cut off the reeds at one of the joints near the roots; they are then cleared of the leaves, and tied up in bundles, and ſent to the mills, which are worked either by water or horſes. The ſugar-mill is compoſed of three rollers of an equal ſize, and all armed with iron-plates, where the canes are to paſs between them; only the middle roller is much higher than the reſt, to give the larger ſweep to the two poles to which the horſes are yoked. This great roller in the middle is furniſhed with a cog full of teeth, which catch the notches in the two ſide rollers, and force them about to bruiſe the canes, which paſs quite round the great roller, and come out dry and ſqueezed from all their juice; which runs into a veſſel or back under the mill, and is thence conveyed through a narrow ſpout into the firſt boiler, in the manner repreſented, *ibid.* let. B, C, C.

After the juice is let out of the firſt veſſel, it is received into another, in which it is boiled more briſkly, and ſcummed from time to time with a large kind of ſpoon, pierced with holes to let the liquor through, while it retains the ſcum and foulneſs ſeparated from it in boiling: towards the end of this boiling, they throw into it a ſtrong lixivium of wood-aſhes, with ſome quick lime among it; this greatly promotes the ſeparation of the foulneſs that yet remains among it; and, after it has boiled ſome time with this addition, they ſtrain it off. The fæces left in the cloths make a kind of wine, when fermented properly with water. The ſtrained liquor, which is now tolerably clean, is let into a third boiler, in which it is boiled down to the conſiſtence of ſugar over a very briſk fire, the people who attend it continually ſtirring and ſcumming it.

Great caution is to be uſed that the boiling matter does not riſe over the ſides of the veſſel, which would be of very dangerous conſequence: they prevent this by taking up quantities of the boiling matter with a ladle, lifting it up high, and letting it run in again, and by now and then adding a ſmall piece of butter, or fat of ſome kind, which takes down the bubbling almoſt inſtantaneouſly. They are very careful that no lemon-juice, or any other acid of that kind, comes near the veſſels, a very ſmall admixture of that being ſufficient to keep the matter from granulating. When the liquor is boiled enough, which is known by its concreting, on throwing a ſpoonful of it up into the air, it is then let out into a fourth veſſel, under which there is a very gentle fire, only kept up that it may have leiſure to granulate; when it has begun to granulate, it is let out of this laſt boiler into a kind of conic earthen veſſels, open at both ends; the wideſt aperture is placed upwards, and the ſmaller end downwards, its aperture being ſtopped with a wooden plug. It is left in theſe veſſels twenty-four hours to concrete; after this

they are removed into ſugar-houſes, and are there aranged in regular order, with a veſſel of earthen-ware under each; the plug is then taken out of the bottom aperture of each, and they are left in this condition for about forty days, that all the thick liquor, or melaſſes, may run from them: after they have ſtood thus long to drain of themſelves, a quantity of clay is diluted, with water, into a thin paſte, and this is poured on the top of every parcel of ſugar in the veſſels, ſo as to cover it two or three inches deep. This water, by degrees, all leaves the clay, and penetrating into the maſs of ſugar, runs through it, and carries off yet more of this foul thick liquid with it, into the veſſels placed underneath to receive it.

When the clay is quite dry, it is taken off, and the firſt preparation of the ſugar is now finiſhed; they ſhake it out of the veſſels, and, cutting it into lumps, which are of a dirty, browniſh, or greyiſh colour, they put it up in hogſheads, and other caſks, under the name of grey or brown ſugar. The ſugar, in this ſtate, ought to be dry, not unctuous, and to have no taſte of burning. The liquor which has run from the ſugar in ſtanding, is boiled to a conſiſtence, and ſold under the name of melaſſes, or treacle; this affords, by fermentation, a very clean and good ſpirit. See MELASSES.

This coarſe ſugar is afterwards refined to various degrees of purity by new ſolutions, and is ſold at different prices, and under different names, according to the degree of purity it is brought to. Our ſugar refiners firſt diſſolve it in water, then clarify the ſolution by boiling with whites of eggs and deſpumation; and after due evaporation, pour it into moulds; where the fluid part being drained off, and the ſugar concreted, its ſurface is covered with moiſt clay, as before. The ſugar thus once refined, by repetition of the proceſs, becomes the double refined ſugar of the ſhops. The candy-ſugar, or that in cryſtals, is prepared by boiling down ſolutions of ſugar to a certain pitch, and then removing them into a hot room, with ſticks placed acroſs the veſſel for the ſugar to ſhoot upon: and theſe cryſtals prove of a white or brown colour, according as the ſugar uſed in the proceſs was pure or impure.

A pound of ſugar purified to the higheſt degree, and diſtilled in a retort, yields firſt about half an ounce of a limpid, inſipid phlegm, without ſmell; and after this comes over a liquor, at firſt limpid and colourleſs, afterwards reddiſh, and, finally, of an empyreumatic ſmell, in quantity not leſs than ſix ounces; this is partly of an acid, partly of an alkaline and urinous taſte; after this comes over a thick and reddiſh oil, in quantity about three drachms; and then more than an ounce of a brown oil of a thicker conſiſtence. The remainder in the retort, calcined and lixiviated, yields a drachm of a pure alkaline ſalt.

Sugar is a true ſalt, and when perfectly pure, after ſolution, it concretes into regular cryſtals; theſe are of a priſmatic figure, and conſiſt of eight plain ſurfaces, in two of which the oppoſite baſes are equal and parallel, the reſt are parallelograms. In its natural ſtate, it manifeſts not the leaſt token of any thing, either acid or alkaline. It is inflammable, in a great degree, burning with a very briſk white flame. It diſſolves, with the utmoſt readineſs, in all aqueous menſtruums, but very difficultly in ſpirituous or oily liquors: mixed with water, it, after a time, ferments, and acquires a vinous flavour; and at this time an inflammable ſpirit, like that of wine, may be drawn from it in a conſiderable quantity.

Many other plants and trees might be found which would yield ſugar: thus ſeveral ſpecies of maples afford a juice which boils into good ſugar. But the great quantity of it yielded by the ſugar-cane, and its eaſy culture, renders it unneceſſary to look farther after what it ſo abundantly ſupplies us with.

The uſes of ſugar, as a ſweetner, are ſufficiently known: it promotes the union of diſtilled oils with watery liquors, and prevents the ſeparation of the butyraceous parts from milk; and hence it is ſuppoſed to unite the unctuous part of the food with the animal juices. Sugar is not only innocent, but reconciles to the palate and ſtomach ſubſtances of themſelves diſguſtful to both; and the impure ſorts, in conſequence of their containing an unctuous or oily matter, prove emollient and laxative. The cryſtals are the moſt difficult of ſolution; and conſequently are moſt proper, where this lubricating ſweet is wanted to diſſolve ſlowly in the mouth.

The medicinal preparations of ſugar are, 1. Sugar of roſes, *ſaccharum roſaceum*, thus made: take of red roſe buds, freed from the heels, and haſtily dried, one ounce; and of double refined ſugar, one pound: reduce

reduce them ſeparately into powder, then mix and moiſten them with water, that they may be formed into troches, which are to be dried with a gentle heat.

2. Red ſugar of roſes, *ſaccharum roſatum rubrum*, is made thus: take of white ſugar, one pound; juice of red-roſes, four ounces; and red-roſes dried, one ounce: boil the ſugar and juice over a gentle fire, till the juice is almoſt all evaporated; then throw in the dry roſes reduced to a very fine powder. Pour out the matter upon a marble, and form it into lozenges according to art.

Theſe preparations are chiefly valued for their agreeableneſs to the eye and palate: ſome likewiſe eſteem them, medicinally, as light reſtringents; and look upon them, not undeſervedly, as an excellent addition to milk, in phthiſical and hectic caſes. Some have been accuſtomed to add a portion of acid, which improves their colour, but at the ſame time renders them leſs proper to be uſed with milk.

3. Barley-ſugar, *ſaccharum hordeatum ſeu penidiatum*, is made by boiling white ſugar in barley-water, *i. e.* a decoction of barley, till it acquires ſuch a conſiſtence, as that it may be drawn out, and twiſted into threads or ſtrings: this is rarely prepared by the apothecaries, or conſidered as a medicine.

SUGAR *of lead*, *ſaccharum ſaturni*. See the article SACCHARUM.

SUGILLATION, in medicine, an extravaſation of blood in the coats of the eye, which at firſt appears of a reddiſh colour, and afterwards livid or black. If the diſorder is great, bleeding and purging are proper, as are diſcutients. The following cataplaſm is ſaid to be very good: Take of comfry-root, ſix ounces; of ſolomon's ſeal, two ounces; of elder-flowers, one ounce and a half; of bean-flour, one ounce; let all theſe be boiled in a ſufficient quantity of ſpring-water. The decoction may be uſed as a fotus, and the ingredients for a cataplaſm.

SUILLUS, in botany, the ſame with the boletus. See BOLETUS.

SUIT, in law, is uſed in different ſenſes, as, 1. For an action, whether perſonal or real. 2. Suit of court, or ſuit-ſervice, which is an attendance the tenant owes to his lord's court. 3. Suit-covenant, where a perſon has covenanted to do ſervice in the court of the lord. 4. Suit-cuſtom, which is where one and his anceſtors have owed ſuit time out of mind. 5. It is uſed for a petition to the king, or any perſon of dignity; where a lord diſtrains his tenant for ſuit, and none is due; in this caſe, the party may have an attachment againſt him to appear in the king's court. 6. Suit of the king's peace, is an action brought againſt a perſon for breach of the king's peace; as in the caſe of treaſons, felonies, or treſpaſſes. See ACTION, COURT, *&c.*

SUIT-SILVER, a ſmall ſum paid in ſome manors, to excuſe the appearance of freeholders at their lord's courts. See the article COURT.

SULDY, a town of France, ſituated on the river Loire, twenty miles ſouth-eaſt of Orleans.

SULMONA, or SOLMONA, a town of the hither Abruzzo, in the kingdom of Naples: eaſt long. 15°, north lat. 42° 6'.

SULPHUR, in natural hiſtory, a genus of foſſils, defined to be dry, ſolid, but friable foſſile bodies; melting with a ſmall heat, when fired in the open air; burning almoſt wholly away with a blue flame, and noxious vapour; and indued with an electric power, and not diſſoluble in acids.

Some have uſed the word ſulphur as a name for the whole ſeries of inflammable bodies, but as we have alſo been uſed to diſtinguiſh thoſe of a particular kind by the ſame name, it ſeems much more eligible to reſtrain that name to thoſe bodies, and to give ſome other for the more general claſſes.

The word ſulphur, in this acceptation, becomes the name of a regular genus of foſſils, of which there are four known ſpecies. 1. The yellow native ſulphur, which in its pureſt ſtate is of a pale ſtraw colour, and as pellucid as the fineſt amber; but is more frequently found coarſer, and more opake. It is found in the gold mines of Peru, in Hungary, and in ſome other places. 2. The green native ſulphur. This is harder than the other, and is uſually found in ſmall maſſes compoſed of ſeveral cruſts. It is found, ſo far as is yet known, only about mount Veſuvius. 3. The grey native ſulphur, which is common in Iceland, and many other places, and is the coarſeſt and worſt of all the kinds. And, 4. the moſt rare and beautiful of all the kinds, the red native ſulphur. This is of a fine glowing red, like cinnabar, and very bright and tranſparent, and is found, ſo far as is yet known, only in the gold mines of Peru.

But beſides theſe native kinds of ſulphur, there is a factitious ſort, by far the moſt common in the ſhops, ſeparated from extraneous matters by means of fire. It is ſometimes met with in very large maſſes, and called ſulphur in the cake; but what we moſt frequently ſee of it is in oblong cylindric rolls of a yellow colour, ſometimes with, and ſometimes without, an admixture of greeniſh. The yellow contains leſs, the greeniſh more, of the vitriolic ſalt mixed with it; it is friable, and affords a ſort of crackling noiſe, when rubbed between the fingers; it is very eaſily reduced to powder, and melts with a ſmall degree of heat. It may be totally ſublimed, in a cloſe veſſel, without alteration. It takes fire on being brought into contact with a burning coal, or any ignited matter; and when pure and genuine, for we are liable to great cheats in regard to it, it does not burn away very quickly, but continues a conſiderable time, emitting a deep blue flame. It is to be choſen for internal uſe of the pureſt and brighteſt yellow, light, eaſily broken, and appearing very bright and gloſſy where it breaks. If it be for making oil of ſulphur, the greeniſh rolls are the beſt, as containing moſt acid.

This kind of ſulphur is ſeparated, by means of fire, from various minerals, which are found naturally to contain it. The greateſt part of what we have, is made from the common vitriolic pyrites, the ſame mineral yielding both ſulphur and vitriol, and often alum. They firſt give it a degree of fire ſufficient to melt the ſulphur it contains, and, when this is all run out into veſſels prepared to receive it, they expoſe the remaining matter to the air, after which they boil it in water, and obtain from the lixivium the common green vitriol or copperas; and after all this is obtained, by adding an alkali to the ſame liquor, they get alum from it. See VITRIOL and ALUM.

Sulphur, under whichever of theſe forms it appears, is ſtill the ſame in all its characters; it diſſolves in oils, and alkaline ſubſtances; it grows red when melted, but turns yellow again when it cools; it affords an acid, the ſame with that of vitriol, if its fumes in burning be catched in a proper manner; but it will not yield this acid by the common way of diſtillation.

Sulphur, melted with gold, provided that metal be pure, makes no ſort of alteration in it; but this is the only metal that eſcapes its effects. Thrown upon ſilver heated red hot, the metal immediately melts, and, if taken from the fire as ſoon as it does ſo, it will be found, when cold, to reſemble lead rather than what it really is. It retains its malleability perfectly, and cuts eaſily with a knife; but it is of a dull bluiſh colour. It is, however, eaſily reduced again to its proper appearance; for there requires no more to this, than the keeping it a few minutes in a ſtrong fire to burn away the ſulphur. If the heat is ſlackened towards the end of this fuſion, the ſilver will not fall into one uniform maſs, but will riſe up in ſmall ſprigs all over the ſurface in a very beautiful manner, reſembling the branches of ſilver, ſometimes ſeen on the ſurface of ores. Tin melted with brimſtone, if the metal be firſt granulated, and the brimſtone added in powder in three times its quantity, deflagrates as if nitre had been mixed with it. The remainder becomes ſolid, while yet in the fire, and, when cold, is a brittle regulus of the colour of lead, and greatly reſembling a ſemi-metal in its qualities. Tin may indeed be wholly turned into ſcoria by burning it with additional parcels of ſulphur. Sulphur melted along with lead deſtroys its malleability, as much as it does that of tin. It becomes hard and rigid, and very difficult of fuſion, and loſes the appearance of lead; being, in the regulus thus obtained, compoſed of broad, bright, and glittering particles. Copper melts immediately upon being made red-hot, if brimſtone be added to it; and becomes a black friable ſubſtance. Iron of all other metals melts the moſt freely and readily with the ſulphur, but it does not freely part with it again. A red hot iron applied to a roll of ſulphur immediately throws off particles diſſolved by the ſulphur into a ſpongy ſcoria. Regulus of antimony melted with ſulphur returns to common crude antimony again. Bizmuth melted with it aſſumes the appearance of antimony, and inſtead of broad flakes is found to be compoſed of needles or ſtriæ running acroſs one another. Zink ſuffers leſs change from it, and mixes indeed leſs eaſily with it; it at length becomes darker-coloured, and more brittle.

Uſes and preparations of SULPHUR. Beſides the great uſe of ſulphur in medicine, chemiſtry, metallurgy, and the making of gun-powder, it is of great ſervice for

for whitening ſilks, and woollen ſtuffs; for which purpoſe, its vapour is contrived to be received by them: its vapour alſo whitens red roſes; and even young rooks, taken out of their neſts, and expoſed thereto, become perfectly white: it has alſo the ſame effect upon gold, which may be reſtored to its colour, by boiling it in water with tartar: and, laſtly, its fumes check and prevent fermentation; on which account, it is much uſed by wine-coopers.

As to the medicinal virtues of ſulphur, it is given, in its crude ſtate with great ſucceſs in diſeaſes of the lungs. It ſtrengthens and cleanſes them, and promotes expectoration, and has at all times been famous for its virtues againſt cutaneous diſeaſes. It generally proves a little looſening to the bowels, and increaſes the diſcharges by perſpiration; it even communicates its ſmell to the perſpired matter for a conſiderable time after taking it, and will often blacken gold or ſilver that is worn by people who take any conſiderable quantity of it.

The preparations of ſulphur, in moſt frequent uſe in the ſhops, are, 1. Flowers of ſulphur, *flores ſulphuris*, a good pectoral medicine. See the article FLOS. 2. Precipitated ſulphur, commonly called milk of ſulphur, made by boiling flowers of ſulphur, with thrice their weight of quick lime, till the ſulphur is diſſolved; and then filtering the ſolution through paper, let a precipitation be made with weak ſpirit of vitriol; and laſtly, by waſhing the precipitated powder found at the bottom of the veſſel, till it becomes quite inſipid. This is good in all uſes, wherein ſulphur in ſubſtance, or its flowers, are uſed; its doſe being from ten grains to two ſcruples. 3. Balſam of ſulphur is made by boiling flowers of ſulphur in four times their weight of oil of olive, in a pot lightly covered, till the oil and ſulphur are united into the conſiſtence of a balſam; and in the ſame manner may a balſam of ſulphur be prepared with barbadoes-tar. This, though highly extolled as a pectoral by ſome authors, ought to be given with great caution; ſince its acrimony muſt render it injurious to weak lungs. 4. Spirit or oil of ſulphur is an acid, obtained by retaining in any manner the vapours of burning ſulphur; it is wholly the ſame with that of vitriol; being an agreeable acid, and good in every caſe in which the ſpirit of vitriol is ſo. 5. Sulphurated water, *aqua ſulphurata*, is made thus: take common water one quart, of pure ſulphur half a pound, ſet a part of the ſulphur on fire in an iron ladle, and ſuſpend it in that ſtate over the water in a cloſe veſſel; let the remainder of the ſulphur be afterwards fired and ſuſpended in the ſame manner, and when the operation is over, the water will have acquired a ſharp acid taſte, and is to be reſerved for uſe. The moſt commodious veſſel for making this is a large glaſs receiver fitted with a wooden plug, into which the handle of the ladle may be fixed; as ſoon as the ſulphur is fired, the ladle is to be thruſt ſo far into the receiver, that the plug may come to ſtop the aperture, and the covering the mouth over this with a wet cloth will be ſufficient to keep in the fumes.

This is the liquor called by ſome authors *gas ſulphuris*; it is an agreeable acid, and is good in malignant and petechial fevers, given in the common drink. It quenches thirſt, and cools the mouth and tongue.

SULPHUR-WORT, in botany, a name by which ſome call peucedanum. See the article PEUCEDANUM.

SULTAN, or SOLDAN, a title of honour, given to the emperor of the Turks. The wife of a ſultan is called ſultana, and the favourite one hhaſeki-ſultana, *i. e.* the private ſultana.

SULTZBACH, or SULTSBACH, a city of Bavaria, thirty-two miles north of Ratiſbon, ſubject to the duke of Neuburg.

SUM, SUMMA, in mathematics, ſignifies the quantity that ariſes from the addition of two or more magnitudes, numbers, or quantities together. See ADDITION.

The ſum of an equation is, when the abſolute number being brought over to the other ſide of the equation, with a contrary ſign, the whole becomes equal to 0: thus, the ſum of the equation $x^3 - 12x^2 + 41x = 42$, is $x^3 - 12x^2 + 41x - 42 = 0$. See EQUATION.

SUMACH, *rhus*, in botany, a genus of the *pentandria-trigynia* claſs of plants, the flower of which conſiſts of five ovato-acuminate and erecto-patent petals, twice as large as the cup; its fruit is a coriaceous roundiſh berry, with only one cell, containing a ſingle roundiſh, and oſſeous ſeed.

This genus comprehends the rhus and texicodendron of Tournefort, and the vernix of Kœmpfer; the berry of the rhus is hairy, and the kernel or ſeed is globoſe;

globoſe: the toxicodendron has the berry ſmooth, but ſtriated, and the nucleus compreſſed and ſulcated: and the vernix has the fructifications on different plants of the ſame ſpecies.

The ſeeds, or berries, of the common ſumach, are moderately aſtringent; and have formerly been preſcribed in this intention, but are now unknown in the ſhops. Their chief uſe, at preſent, is in the preparation of morocco, and other leather. See MOROCCO and LEATHER.

Myrtle-SUMACH, *coriaria*, in botany. See the article CORIARIA.

Venetian SUMACH, *cotinus*, in botany. See the article COTINUS.

SUMATRA, an iſland in the Eaſt-indian ocean, ſituated between 93° and 104° eaſt long. and between 5° 30′ north lat. and 5° 30′ ſouth lat. extending from north-weſt to ſouth-eaſt, nine hundred miles long, and from one hundred to one hundred and fifty broad.

SUMEREIN, a town of lower Hungary, fifteen miles ſouth of Preſburg, ſubject to the houſe of Auſtria.

SUMMARY, in matters of literature, the ſame with abridgment. See the article ABRIDGMENT.

Summary, however, is often uſed for a table of contents, placed at the beginning of books, to ſhew the principal heads treated of therein. See BOOK.

SUMMATORIUS CALCULUS, in mathematics. See the article CALCULUS.

SUMMER, one of the ſeaſons of the year, commencing in theſe northern regions on the day the ſun enters Cancer, and ending when he quits Virgo. Or, more ſtrictly and univerſally, the ſummer begins on the day when the ſun's meridian diſtance from the zenith is the leaſt; and ends on the day, when his diſtance is a mean betwixt the greateſt and ſmalleſt. The end of ſummer coincides with the beginning of winter. See SEASONS.

SUMMER, in architecture, is a large ſtone, the firſt that is laid over columns and pilaſters, in beginning to make a croſs vault; or it is the ſtone which, being laid over a piedroit or column, is hollowed to receive the firſt haunce of a platband.

SUMMER, in carpentry, is a large piece of timber which being ſupported on two ſtone piers or poſts, ſerves as a lintel to a door, window, &c.

SUMMIT, the top or vertex of any body, or figure; as of a triangle, cone, pyramid, &c. See TRIANGLE, CONE, &c.

SUMMITS *of Flowers*, the ſame with the antheræ, or apices. See ANTHERÆ.

SUMMONS, in law, a citing or calling a perſon to any court, to anſwer a complaint, or even to give in his evidence.

There muſt always be a ſummons in real actions, whereby the ſheriff warns the party to appear at a day on the tenants land; alſo fourteen days before the return, proclamation is to be made thereof, in order that the grand cape may iſſue.

SUMMONS and SEVERANCE. See the article SEVERANCE.

SUMMUM BONUM, in ethics. See the articles GOOD and HAPPINESS.

SUMPTUARY LAWS, *leges ſumptuariæ*, are laws made to reſtrain exceſs in apparel, coſtly furniture, eating, &c.

SUN, *ſol*, ☉ in aſtronomy, the great luminary which enlightens the world, and by its preſence, conſtitutes day. See the articles DAY and DIURNAL.

The ſun is the principal ſource of heat upon the earth's ſurface, and the confines of the earth and atmoſphere without this, ſays Dr. Shaw, all the bodies upon our globe would doubtleſs grow fixed, rigid and lifeleſs; it being the ſolar heat that ſtirs within them, as the main ſpring of their actions; cauſing all the operations in the animal, vegetable, and mineral kingdoms; and hence alſo, the ocean and atmoſphere continue in a fluid ſtate. See FIRE and HEAT.

Sir Iſaac Newton, in his optics, gives good reaſons to ſuppoſe the ſun and fixed ſtars to be great earths vehemently hot; whoſe heat is conſerved by the greatneſs of their bodies, and the mutual action and re-action between them and the light which they emit; and whoſe parts are kept from fuming away, not only by their fixity, but alſo by the vaſt weight and denſity of the atmoſpheres incumbent on them, and every way ſtrongly compreſſing them, and condenſing the vapours and exhalations which ariſe from them. The light ſeems to be emitted from the ſun and fixed ſtars (which probably are ſuns to other ſyſtems) much after the manner as iron, when heated to ſuch a degree as to be juſt going into fuſion, by the vibrating motion of its parts, emits, with force and violence, copious ſtreams of liquid fire all around. Great bodies muſt preſerve their heat longeſt, and that, perhaps, in the proportion of their diameters. See the article STAR.

The ſun, then, may be conceived to be a huge body of fire, whence all the planets

planets receive their light; and by the emanation of whoſe rays and beams of light, the whole ſyſtem of beings about us is illuminated and rendered viſible.

In order to compute the diameter, and bulk, or ſolid content, of the ſun, its diſtance from the earth muſt be firſt known by means of the horizontal parallax; to find which, aſtronomers have attempted a variety of methods, but have as yet found none that will determine it exactly: however, by many repeated obſervations of Dr. Halley, it is found to be not greater than 12″, nor leſs than 9″. Wherefore 10 ½″ (the mean) has been fixed upon as near the truth, which we muſt be contented with till May 26, 1761, when Venus will tranſit the ſun's diſk, by which means the ſame gentleman has ſhewn the ſun's parallax may be determined to a great nicety, *viz.* to within a five hundredth part of the whole. See Phil. Tranſ. n° 348, abridged by Jones, Vol. IV. See the article PARALLAX.

Suppoſing, then, the ſun's horizontal parallax to be 10″, its diſtance will be found to be 82136014 britiſh miles: and having a double convex lens, as L, (plate CCLXII. fig. 8.) whoſe focus of parallel rays is at C D, 12 feet, or 144 inches, diſtant from itſelf: let this lens be fixed in the window-ſhutter of a darkened room, to receive the ſun's rays A L, B L, which coming from the extreme parts of the ſun's body, and interſecting each other in the center of the lens, will determine the diameter of the ſun's image at C D; which, being nicely meaſured, will be found $1\frac{34}{100}$ of an inch, the half of which is C $e = \frac{67}{100}$ of an inch. Then ſay,

As the focal diſtance	C L =	144 =	2.158362
To ½ the diameter of the image	C e =	0. 67 =	0.173925
So is the radius	R =	90° 00′ =	10.000000
To the ſine of the angle	C L e =	00° 16′ =	7.667713

Therefore, the whole angle C L D (= A L B) = 32′, which is the ſun's apparent diameter, or that under which its diameter appears to the eye.

Now ſince the diameter of any object and its image, are proportional to their diſtances from the lens, the real diameter may be found by the following analogy:

As the diſtance of the image	C L =	144 =	2.158362
To its diameter	C D =	1.34 =	0.127105
So is the diſtance of the ſun	L A =	82136014 =	7.914533
To the ſun's diameter,	A B =	764320 =	5.883276

Hence the diameter of the ſun is found to be 764,320 engliſh miles; though by other computations, its diameter is found to be only 763,460 miles, and its diſtance from our earth 81,000,000 of miles. See the articles DISTANCE and DIAMETER, under the laſt of which articles its leaſt mean and greateſt apparent diameters may be ſeen, both according to de la Hire and Hevelius.

The quantity of matter in the ſun, compared with that of the earth, has already been taken notice of under EARTH.

From what has there been ſaid, it follows, that the common center of gravity, of the ſun and jupiter, is nearly in the ſuperficies of the ſun; of ſaturn and the ſun a little within it. And by calculation it is found that the common center of gravity of all the planets cannot be more than the length of the ſolar diameter diſtant from the center of the ſun: this common center of gravity is proved to be at reſt; and therefore, though the ſun, by reaſon of the various poſition of the planets, may be moved every way, yet it cannot recede far from the common center of gravity. And this it is thought ought to be accounted the center of our world. See the articles COPERNICAN, SYSTEM, CENTER, *&c.*

By means of the ſolar ſpots it hath been diſcovered, that the ſun revolves round his own axis, without moving (conſiderably) out of his place, in about twenty-five days. And that the axis of this motion is inclined to the ecliptic, in an angle of 87 degrees, 30 minutes, nearly. See MACULÆ and FACULÆ.

The ſun's apparent diameter being ſenſibly ſhorter in December than in June, as is plain and agreed from obſervation, the ſun muſt be proportionably nearer to the earth in winter than in ſummer: in the former of which ſeaſons will be the perihelion, in the latter the aphelion: and this is alſo confirmed by the earth's moving ſwifter in December than it doth in June. For ſince, as Sir Iſaac Newton hath demonſtrated, the earth always deſcribes equal areas in equal times, whenever it moves ſwifter, it muſt needs be

nearer

nearer to the ſun. And for this reaſon there are about eight days more from the ſun's vernal equinox to the autumnal, than from the autumnal to the vernal.

For the apparent annual motion round the earth, ſee the article EARTH.

If you divide 360 degrees (*i. e.* the whole ecliptic) by the quantity of the ſolar year, it will quote 59 minutes 8 ſeconds, *&c.* which therefore is the quantity of the ſun's diurnal motion. And, if this 59 minutes 8 ſeconds be divided by 24, you have the ſun's horary motion, which is 2 minutes 28 ſeconds; and, if you will divide this laſt by 60, you will have this motion in a minute, *&c.* And this way are the tables of the ſun's mean motion, which you have in the books of aſtronomical calculation, conſtructed.

For eclipſes of the ſun, cycle of the ſun, maculæ and faculæ of the ſun, *&c.* See ECLIPSE, CYCLE, *&c.*

SUN-FISH, *mola*, in ichthyology. See the article MOLA.

SUN-FLOWER, in botany. See the articles HELIANTHUS and HELIANTHEMUM.

Dwarf SUN-FLOWER, *rudbeckia*, in botany. See RUDBECKIA.

SUN-DEW, *ros ſolis*. See ROS.

SUNDA-ISLANDS, thoſe ſituated near the ſtraits of Sunda, in the indian ocean; the chief of which are Borneo, Java, Sumatra, *&c.* See BORNEO, *&c.*

SUNDAY, or the LORD'S-DAY, a ſolemn feſtival obſerved by Chriſtians on the firſt day of every week, in memory of our Saviour's reſurrection.

This is the principal and moſt noted of the chriſtian feſtivals, and was obſerved with great veneration in the antient church, from the time of the apoſtles, who themſelves are often ſaid to have met on that day for divine ſervice. It is likewiſe called the ſabbath-day, as being ſubſtituted in the room of the jewiſh ſabbath. See the article SABBATH.

The antients retained the name Sunday, or *dies ſolis*, in compliance with the ordinary forms of ſpeech, the firſt day of the week being ſo called by the Romans, becauſe it was dedicated to the worſhip of the ſun.

Beſides that the moſt ſolemn parts of the chriſtian worſhip were always performed on ſundays, this day was diſtinguiſhed by a peculiar reverence and reſpect expreſſed towards it in the obſervation of ſome ſpecial laws and cuſtoms. Among theſe, we may reckon in the firſt place, thoſe imperial laws which ſuſpended all proceedings at law upon this day, excepting only ſuch as were of abſolute neceſſity, or eminent charity; ſuch as the manumiſſion of ſlaves, and the like. Neither was it only the buſineſs of the law, but all ſecular and ſervile employments were ſuperſeded upon this day, ſtill excepting acts of neceſſity and mercy. Another thing which the chriſtian laws took care of, to ſecure the honour and dignity of the lord's day, was, that no ludricrous ſports or games ſhould be followed on this day; but all ſuch recreations and refreſhments as tended to the preſervation or conveniency of life were allowed of; and therefore, ſunday was always a day of faſting, and it was not allowable to faſt thereon, not even in Lent. The great care and concern of the primitive Chriſtians in the religious obſervation of the lord's-day, appears firſt from their conſtant attendance upon all the ſolemnities of public worſhip, from which nothing but ſickneſs, impriſonment, baniſhment, or ſome great neceſſity could detain them. Secondly, from their zeal in frequenting religious aſſemblies on this day, even in times of the hotteſt perſecution, when they were often beſet and ſeized in their meetings and congregations. Thirdly, from their ſtudious obſervations of their vigils or nocturnal aſſemblies that preceded the lord's-day. Fourthly, from their eager attendance on ſermons, in many places, twice upon this day, and their conſtant reſorting to evening prayers, where there was no ſermon. Laſtly, from the ſevere cenſures inflicted on thoſe who violated the laws concerning the religious obſervation of this day, ſuch perſons being uſually puniſhed with excommunication, as appears from the apoſtolical conſtitutions, and the canons of ſeveral councils. In the romiſh breviary, and other offices, we meet with a diſtinction of ſundays, into thoſe of the firſt and ſecond claſs; Sundays of the firſt claſs are, Palm-ſunday, Eaſter-ſunday, Advent, Whitſunday, *&c.* thoſe of the ſecond claſs are the common ſundays of the year. See PALM-SUNDAY, EASTER-SUNDAY, *&c.*

By our laws, no perſon is to do any worldly labour on this day, which is ſet apart for the ſervice and worſhip of God, except works of neceſſity and charity, under the penalty of five ſhillings. And if any perſon cry, or expoſe to ſale any wares, or goods on a Sunday, the

ſame

ſame will be forfeited to the poor, *&c.* the offender being convicted thereof before a juſtice of the peace, *&c.* who is authoriſed to cauſe the penalties and forfeitures to be levied by diſtreſs. Yet this extends not to dreſſing of meat, nor to the crying or ſelling of milk in the morning or evening, or the ſelling of mackrel on that day. The ſunday is not a day in law, ſo that no proceſs lies, or may be ſerved thereon, except for treaſon, or felony, or on an eſcape. A ſale of goods, or contract made on a ſunday, is deemed void. For the ſunday-letter, or that letter of the alphabet which points out in the calendar the ſundays throughout the year. See DOMINICAL LETTER.

SUNDERLAND, a port-town of Durham, ſituated on the German Sea, at the mouth of the river Ware, ten miles north-eaſt of Durham city.

SUNDERLAND, or SUDERMANIA, a province of Sweden, bounded by the Meller Lake, which divides it from Uplandia, on the north; by the Baltic Sea on the eaſt; and by Gothland on the ſouth and weſt.

SUNNEBERG, a town of Germany, in the circle of Upper Saxony, and marquiſate of Brandenburg, ſituated fifty miles north-eaſt of Berlin.

SUNTGOW, a territory in the circle of the upper Rhine in Germany, bounded by Alſace on the north; by the river Rhine, which divides it from the Briſgow, on the eaſt; by Switzerland on the ſouth, and by Franche-Compte on the weſt.

SUOVETAURILIA, an antient roman ſacrifice, ſo called becauſe it conſiſted of a pig (*ſus*) a ſheep, or rather ram (*ovis*) and a bull (*taurus*). They were all males, to denote the maſculine courage of the roman people. It was likewiſe called ſolitaurilia, becauſe the animals offered up were always (*ſolida*) whole or uncut.

SUPERBIPARTIENS. See the article RATIO.

SUPERCARGO, a perſon employed by merchants to go a voyage, and overſee their cargo, or lading, and diſpoſe of it to the beſt advantage. See the articles CARGO, FACTOR, *&c.*

SUPERCILIUM, in anatomy, the eyebrow. See the article EYE-BROW.

SUPERCILIUM, in the antient architecture, the uppermoſt member of the corniche, called by the moderns corona, crown, or larmier.

It alſo uſed for a ſquare member, under the upper tore in ſome pedeſtals; ſome authors confound it with the tore itſelf. See the article TORE.

SUPEREROGATION, in theology, what a man does beyond his duty, or more than he was commanded to do. The Romaniſts ſtand up ſtrenuouſly for works of ſupererogation, and maintain, that the obſervance of evangelical councils is ſuch. By means hereof, a ſtock of merit is laid up, which the church has the diſpoſal of, and which ſhe diſtributes in indulgences to ſuch as need. The reformed church do not allow of any work of ſupererogation.

SUPERFETATION, *ſuperfœatio*, in medicine, a ſecond, or after conception, happening, when the mother, already pregnant, conceives of a later coition; ſo that ſhe bears at once two fœtuſes of unequal age and bulk, and is delivered of them at different times. We meet with inſtances of ſuperfetations in Hippocrates, Ariſtotle, Du Laurens, *&c.* But they are ſaid to be much more frequent in hares and ſows. Naturaliſts hold, that female rats are frequently born with young rats in their wombs; and we are told of extraordinary inſtances of this kind in the female part of the human ſpecies, by Bartholine, Mentzelius, and in the hiſtory of the Royal Academy of Sciences.

SUPERFICIAL CONTENT. See SUPERFICIES, AREA, and MEASURING.

SUPERFICIAL *fourneau*, in fortification, the ſame with caiſſon. See CAISSON.

SUPERFICIES, or SURFACE, in geometry, a magnitude conſidered as having two dimenſions; or extended in length and breadth, but without thickneſs or depth. In bodies, the ſuperficies is all that preſents itſelf to the eye. A ſuperficies is chiefly conſidered as the external part of a ſolid. When we ſpeak of a ſurface ſimply, and without any regard to body, we uſually call it figure. The ſeveral kinds of ſuperficies are as follow. Rectilinear ſuperficies, that comprehended between right lines; curvilinear ſuperficies, that comprehended between curve lines; plane ſuperficies, is that which has no inequality, but lies evenly between its boundary lines; convex ſuperficies, is the exterior part of a ſpherical, or ſpheroidical body; and a concave ſuperficies, is the internal part of an orbicular or ſpheroidical body.

The meaſure or quantity of a ſuper-

ficies, or ſurface, is called the area thereof. See AREA and MEASURE.

The finding of this meaſure, or area, is called the quadrature thereof. See the article QUADRATURE.

To meaſure the ſurfaces of the ſeveral kinds of bodies, as ſpheres, cubes, parallelepipeds, pyramids, priſms, cones, *&c.* See the article SPHERE, *&c.*

Line of SUPERFICIES, a line uſually found on the ſector, and Gunter's ſcale, the deſcription and uſe whereof, ſee under SECTOR and GUNTER'S SCALE.

SUPERFINE, in the manufactories, a term uſed to expreſs the ſuperlative fineneſs of a ſtuff; thus a cloth, a camblet, *&c.* are ſaid to be ſuperfine, when made of the fineſt wool, *&c.* or when they are the fineſt that can be made. The term is particularly uſed among gold or ſilver wire-drawers, for the gold or ſilver wire, which after being drawn through an infinite number of holes, each leſs and leſs, is at length brought to be no bigger than an hair.

SUPERINSTITUTION, *ſuperinſtitutio*, denotes an inſtitution upon another, as where A B is admitted and inſtituted to a benefice upon one title, and C D is admitted and inſtituted on that of another.

SUPERINTENDANT, in the french cuſtoms, an officer who has the prime management and direction of the finances or revenues of the king. The term is alſo uſed for the firſt officer of the queen's houſhold, who has the chief adminiſtration thereof. They have alſo a ſuperintendant of the buildings, anſwering to the ſurveyor of the works among us. See the article SURVEYOR.

SUPERINTENDANT alſo denotes an eccleſiaſtical ſuperior in ſeveral reformed churches, where epiſcopacy is not admitted, particularly among the Lutherans in Germany, and the Calviniſts in ſome other places. The ſuperintendant is in effect little other than a biſhop, only his power is ſomewhat more reſtrained than that of the dioceſan biſhops. He is the chief paſtor, and has the direction of all the inferior paſtors within his diſtrict or dioceſe.

SUPERIOR, or SUPERIOUR, ſomething raiſed above another, or that has a right to command another.

SUPERJURARE, was antiently a term uſed in our law where a criminal endeavoured to excuſe himſelf by his own oath, or by the oath of one or two witneſſes; and the crime charged againſt him was ſo notorious, that he was convicted upon the oaths of many more witneſſes; this was termed ſuperjurare.

SUPERLATIVE, in grammar, one of the three degrees of compariſon, being that inflexion of nouns-adjective that ſerves to augment and heighten their ſignification, and ſhews the quality of the thing denoted to be in the higheſt degree. See the articles COMPARATIVE, POSITIVE, and COMPARISON.

In engliſh, the ſuperlative is uſually formed by the addition of *eſt* to the poſitive, as *richeſt*, *greateſt*, *&c.* and frequently by prefixing of *moſt*, as *moſt rich*, *moſt great*, *&c.*

SUPERNUMERARY, ſomething over and above a fixed number. In ſeveral of the offices are ſupernumerary clerks, to be ready on extraordinary occaſions. There are alſo ſupernumerary ſurveyors of the exciſe, to be ready to ſupply vacancies when they fall; theſe have but half-pay. In muſic, the ſupernumerary, called by the Greeks proſlambanomenos, is the loweſt of the chords of their ſyſtem, anſwering to *a*, *mi*, *la*, of the loweſt octave of the moderns. See the article DIAGRAM.

SUPERONERATIONE PASTURÆ, in law, a judicial writ which lies againſt a perſon that is impleaded in the county-court, for ſurcharging of a common with his cattle, in a caſe where he was formerly impleaded for it in the ſame court, and the cauſe is removed into one of the courts at Weſtminſter.

SUPERPARTICULAR, SUPERPARTIENS, } See RATIO.

SUPER-PRÆROGATIVA REGIS, in law a writ that formerly lay againſt the king's widow, for marrying without a licence.

SUPER-PURGATION, *hypercathraſis*, in medicine, an exceſſive over-violent purging, the uſual effects of colliquating, corroſive and ſtimulating medicines. In the beginning of this diſorder, a very thin matter is evacuated: but afterwards, when the relaxation and aperture of the veſſels are increaſed, the neceſſary humours are diſcharged; there is firſt an excretion of yellow bile, then of phlegm, then of black bile, and laſt of all blood. See the article FLUX.

Thoſe who labour under a ſuperpurgation, muſt be treated with frictions of the ſkin, and a warm bath, drinking before they bathe thin, red, or yellow wine, for ſuch is eaſieſt of diſtribution, with ſops of bread, and pomegranates.

If

If the evacuation continues, let the limbs be bound in ſuch a manner, that the bandage may be carried from the upper to the lower parts. Exhibit alſo a ſmall quantity of theriaca, to be taken with the fleſh of vipers, or for want of that, troches of theriaca, or troches of ſeeds, and of the antidote called philonium. Cupping-glaſſes may alſo be applied to the ſtomach, and cataplaſms of polenta and mulſum; after which, you may uſe aſtringent epithems, but the greateſt relief is had from frictions of the whole body, and potable remedies. The patient ſhould keep himſelf from cold air, or what is very warm. If the evacuation ſtill continues, the aforeſaid cataplaſms ſhould be applied, and obtundents injected in clyſters, ſuch as the fat of gooſe, ſweet wine, oil of ſpike, and the like.

SUPERQUADRIPARTIENS. See the article RATIO.

SUPERSCAPULARIS INFERIOR, in anatomy, the ſame with infraſpinatus. See the article INFRASPINATUS.

SUPERSCAPULARIS SUPERIOR, is the ſame with ſupraſpinatus. See the article SUPRASPINATUS.

SUPERSEDEAS, in law, according to Fitzherbert, is a writ which lies in divers caſes, and in general ſignifies a command to ſtay ſome of the ordinary proceedings in law, which, on good cauſe ſhewn, ought not to proceed. It is likewiſe uſed for ſtaying of an execution after a writ of error is allowed, and bail put in, but not before bail is given, in caſe there be a judgment upon verdict, or by default in debt, *&c.* A ſuperſedeas is alſo granted by the court for ſetting aſide an erroneous judicial proceſs, *&c.* And a priſoner may be thereby diſcharg'd upon entering his appearance, and on the plaintiff's not filing a declaration againſt him. For this writ is as good a cauſe to diſcharge the perſon, as the firſt proceſs is to arreſt him. There is a further writ of ſuperſedeas, where an audita querela is ſued, and in caſes of ſurety of the peace, when one is already bound to the peace in chancery, or elſewhere.

SUPER-STATUTO DE ARTICULIS CLERI, in law, a writ that lies againſt the ſheriff, or other officer that diſtrains in the king's highway, or in the lands antiently given to the church.

SUPER-STATUTO FACTO POUR SENESCHAL ET MARSHAL DE ROY, *&c.* a writ which lies againſt the ſteward or marſhal, for holding plea of freehold in his court, or for treſpaſs, or contracts not made within the king's houſhold.

SUPER-STATUTO VERSUS SERVANTES ET LABORATORES, a writ lying againſt a perſon who keeps another perſon's ſervant departed from his ſervice, contrary to law.

SUPERSTITION, extravagant devotion, or religion, wrong directed, or conducted.

SUPERVISOR, a ſurveyor, or overſeer. See the article SURVEYOR, *&c.*

It was formerly, and ſtill remains a cuſtom among ſome perſons, to appoint a ſuperviſor of a will, to ſee that the executors thereof do punctually obſerve and perform the ſame.

Superviſor formerly was uſed for ſurveyor of the highways. There are likewiſe certain officers of the exciſe, who are called ſuperviſors, on account of their having the ſuperviſing and inſpecting of the books, *&c.* of the inferior officers belonging to that branch of the revenue, to prevent their neglect of duty.

SUPINATION, in anatomy, the action of a ſupinator-muſcle, or the motion whereby it turns the hand ſo as that the palm is lifted up towards heaven. See the next article.

SUPINATOR, in anatomy, a denomination given to two muſcles of the arm, the one called the ſupinator longus, the other the ſupinator brevis, both ſerving to turn the palm of the hand upwards. The firſt has its origin from the exterior ſpine of the humerus, and its termination at the lower end of the radius; the ſecond riſes from the upper part of the ulna, and is inſerted into the upper part of the radius, which it totally ſurrounds and incloſes. This laſt muſcle may alſo be of uſe in the bending of the cubit.

SUPINE, in latin grammar, part of the conjugation of a verb, being a verbal ſubſtantive of the ſingular number, and the fourth declenſion.

There are two kinds of ſupines; one, called the firſt ſupine, ending in *um*, of the accuſative caſe, is always of an active ſignification, and marks a motion, as *abiit deambulatum*; the other, called the laſt ſupine, and ending in *u*, of the ablative caſe, is of a paſſive ſignification, and is governed by ſubſtantives or adjectives, as, *facile dictu*, &c.

SUPPLE, to ſupple a horſe in the manege, is to make him bend his neck,

ſhoulders, and ſides, and to render all the parts of his body more pliable.

SUPPLEMENT *of an arch*, in geometry, or trigonometry, is the number of degrees that it wants of being an intire ſemicircle; as a complement, ſignifies what an arch wants of being a quadrant. See the article COMPLEMENT.

SUPPLEMENT, in matters of literature, an appendage to a book, to ſupply what is wanting therein.

SUPPLICAVIT, in law, a writ that iſſues out of the court of Chancery for taking ſurety of the peace, where a perſon is in danger of receiving ſome bodily hurt from another. It is directed to the juſtices of the peace and ſheriff of the county, and is grounded on the ſtatute 1. of Edward III. which appoints, that certain perſons ſhall be appointed by the lord-chancellor to take care of the peace. In order to ſue out this writ, the party requiring it firſt goes before one of the maſters in Chancery and makes oath, that he does not deſire the ſame out of any malice, but purely for his own ſafety, and the ſecurity of his perſon; upon which the maſter will make out a warrant, ordering the writ to be made out by one of the clerks of the ſix clerk's-office, after which the writ muſt be delivered to the ſheriff to have his warrant thereon for arreſting the party, *&c.*

SUPPORTED, in heraldry, a term applied to the uppermoſt quarters of a ſhield when divided into ſeveral quarters, theſe ſeeming as it were ſupported or ſuſtained by thoſe below. The chief is ſaid to be ſupported when it is of two colours, and the upper colour takes up two thirds of it. In this caſe it is ſupported by the colour underneath.

SUPPORTERS, in heraldry, figures in an atchievement placed by the ſide of the ſhield, and ſeeming to ſupport or hold up the ſame. Supporters are chiefly figures of beaſts: figures of human creatures, for the like purpoſe, are properly called tenants. Some make another difference between tenant and ſupporter: when the ſhield is borne by a ſingle animal, it is called tenant; when by two, they are called ſupporters. The figures of things inanimate ſometimes placed aſide of eſcutcheons, but not touching or ſeeming to bear them, though ſometimes called ſupporters, are more properly cotiſes. See TENANT and COTICE.

The ſupporters of the britiſh arms are a lion and an unicorn. thoſe of the french arms are angels, *&c.* See ARMS.

In England, none under the degree of a banneret are allowed ſupporters, which are reſtrained to thoſe called the high nobility. The Germans permit none but princes and noblemen of rank to bear them: but among the French the uſe of them is more promiſcuous.

SUPPOSITION, in muſic, the uſing two ſucceſſive notes of equal value as to time, one of which, being a diſcord, ſuppoſes the other a concord. See HARMONY.

The harmony, Mr. Malcolm obſerves, is to be always full on the accented part of the meaſure or bar, and void of diſcords; yet here diſcords, by proper reſolution and preparation, are even neceſſary on the unaccented part of the meaſure. Diſcords, by conjoint degrees, may paſs without much offence, and it is not there required that the harmony be ſo complete as on the accented part. This tranſient uſe of diſcords, followed by concords, makes what the French call ſuppoſition. There are ſeveral kinds of ſuppoſition. The firſt is when the principal parts proceed gradually from concord to diſcord, and from diſcord to concord; the intervening diſcord ſerving only as a tranſition to the following concord. Another kind is when the parts do not proceed gradually from the diſcord to the concord, but deſcend to it by the interval of a third. A third kind, like the ſecond, is when the riſing to the diſcord is gradual, but the deſcending from it to the following concord, is by the diſtance of a fourth. A fourth kind, very different from all the reſt, is when the diſcords fall on the accented part of the meaſure, and the riſing to it is by the interval of a fourth; in which caſe it is abſolutely neceſſary to follow it immediately by a gradual deſcent into a concord that has juſt been heard before the harmony to make the preceding diſcord paſs without offence, and only ſeem a tranſition to the concord.

SUPPOSITORY, *ſuppoſitorium*, in pharmacy, a kind of medicated cone, or ball, which is introduced to the anus for opening the belly. Suppoſitories are uſually made of ſoap, ſugar, alum, or a piece of tallow-candle, about the length of a man's thumb and the breadth of a finger, though they may be made ſmaller for children, and ſometimes a little thicker for adults. Suppoſitories are ſometimes compounded

compounded of ingredients adapted to the diſeaſe and circumſtances of the patient, as of honey, ſalt, powder of aloes, colocynthia, and the like. If one ſuppoſitory does not occaſion a ſtool, it muſt be followed by another ſtronger one; and if that does not ſucceed, the repetition muſt be continued till the effect required is produced. They are ſometimes lubricated with oil or butter, that they may be introduced with greater eaſe. Some uſe a lozenge of ſugar, or a piece of thin linnen cloth rolled up with a little lard or ſalt-butter, which greatly looſens the belly. For ulcers of the rectum, the beſt ſuppoſitories are made of honey of roſes, powder of maſtich and myrrh, or of colophony. The ſtronger ſuppoſitories, which are compoſed of acrid and ſtimulating ingredients, are advantageouſly uſed in promoting a difficult birth, if the infant be in a natural poſition; and alſo for expelling the ſecundines when they are tenaciouſly retained in the uterus. In exhibiting them the patient ſhould be put in the ſame poſture as in giving a clyſter, and the ſuppoſitory muſt be gently thruſt up the anus with the finger.

SUPPRESSION, in law, the extinction or annihilation of an office, right, rent, or the like.

SUPPRESSION, in grammar and rhetoric, denotes an omiſſion of certain words in a ſentence, which yet are neceſſary to full and perfect conſtruction: as, "I come from my father's;" that is, "from my father's houſe."

Suppreſſion is a figure of ſpeech very frequent in our language, chiefly uſed for brevity and elegance. Some rules relating hereto are as follow: 1. Whenever a word comes to be repeated in a ſentence oftener than once, it is to be ſuppreſſed. Thus we ſay, "This is my maſter's horſe," not "This horſe is my maſter's horſe." 2. Words that are neceſſarily ſupplied may be ſuppreſſed: and 3. All words that uſe and cuſtom ſuppreſs in other languages, are alſo to be ſuppreſſed in Engliſh, unleſs there be particular reaſons for the contrary.

Suppreſſion is alſo a figure in ſpeech whereby a perſon in rage, or other diſturbance of mind, ſpeaks not out all he means, but ſuddenly breaks off his diſcourſe. Thus the gentleman in Terence, extremely incenſed againſt his adverſary, accoſts him with this abrupt ſaying, "Thou of all." The exceſs of his indignation and rage choaked the paſſage of his voice, and would not ſuffer him to utter the reſt. But in theſe caſes, though the diſcourſe is not complete, the meaning is readily underſtood, and the evidence of the thought eaſily ſupplies the defect of words. Suppreſſion ſometimes proceeds from modeſty and fear of uttering any word of ill and offenſive ſound.

SUPPRESSION, in medicine, is generally uſed for a retention of urine or the menſes. See the article DYSURY, ISCHURY, MENSES, &c.

SUPPRESSIONIS IGNIS, a fire of ſuppreſſion, a term uſed in chemiſtry to expreſs ſuch an application of fire to any ſubject that it ſhall at once act upon it, both above and below, in the ſame manner. The uſual way of giving this heat is by covering the veſſel in which the ingredients are put with ſand, and then laying hot coals upon that, ſo that they may heat through the ſand downwards.

SUPPURATION, in medicine and ſurgery, the ſecond way wherein an inflammation terminates, being a converſion of the inſpiſſated blood and the ſoft adjacent parts, as the veſſels and fat into pus, or matter: which diſorder, when it has not yet found an opening, is generally called an abſceſs. See the articles INFLAMMATION, ABSCESS, PHLEGMON, TUMOUR, &c.

The beſt cure of an inflammation is by reſolution or diſperſion: but when this is out of the power of the ſurgeon or phyſician to effect, and when tumours and phlegmons ſhew a tendency to ſuppuration, all the reſolving and diſperſing medicines muſt be laid aſide, and great care muſt be taken to forward the maturity of the inflammation; that is, to convert the ſtagnated blood into laudable matter; then to give a diſcharge or vent to this ſuppurated matter; afterwards to cleanſe the part; and finally to incarn and heal it. See the articles DISPERSION, ULCER, WOUND, &c.

In general, ſuppuration is to be promoted by ſuch of the emollient medicines as obſtruct the pores of the ſkin, as fats, oils, and glutinous medicines; as alſo the ſharp, pungent, and in ſome degree cauſtic medicines, which may be uſed in form of cataplaſms or plaſters. But to be more particular, ſuppurating medicines, beſides thoſe already enumerated under abſceſs, &c. are the fats of a gooſe, of a dog, of a man, of a viper, and of a bear; pigeon and cow-dung; bran, yeaſt,

yeaſt, herrings, leeches, melilot, tobacco, oil, burgundy pitch, common-pitch, roſin, deer-ſuet, ox-ſuet, ſheep-ſuet, and frankincenſe. Theſe medicines, either alone or compounded, are to be applied hot to the part, and the application frequently repeated, till the matter within is found to be ſufficiently ripened by the ſoftneſs and whiteneſs of the tumour: but when the abſceſs is ſmall, it is ſufficient and more convenient to apply ſome of the ripening plaſters, as diachylon, with the gums, or the like, till the ſuppuration is perfected.

A ripening cataplaſm from the London diſpenſatory, is as follows: Take of figs, four ounces; yellow baſilicum ointment, one ounce; galbanum ſtrained, half an ounce: beat the figs thoroughly in a mortar, occaſionally dropping in ſome ſpirit of wine, or ſtrong ale; then carefully mix them with the ointment firſt liquified along with the galbanum. And a ripening plaſter from the Edinburgh diſpenſatory is this, Take of gum-plaſter, an ounce and a half; burgundy-pitch, half an ounce: boil them together.

In general, it is to be obſerved, that ſuppurative medicines are ſuch as by the activity and warmth of their parts are able to penetrate the pores, and mix with and rarify any obſtructed matter, ſo that it may be rendered fit to diſcharge, upon laying open the part by a cauſtic or inciſion. Now, in many inſtances, as the matter by this means rarifies and grows more fluid, the refluent blood is apt to waſh it back into the common maſs, which ſometimes is of that nature as to do a great deal of miſchief; or by making it take up more room upon its rarefaction, occaſions it more to diſtend the parts in which it is contained, whereon a ſenſe of pain is excited, and thereby a greater concourſe of fluid, and conſequently a needleſs increaſe of the tumour; ſo that medicines under this denomination require to be in the hand of ſuch as are ſo well acquainted with the mechaniſm of the animal œconomy as to be able to apply them to the beſt advantage, and know how to avoid the hazards which may ariſe from their abuſe. Nor are internal remedies to be neglected in order to further a ſuppuration, eſpecially when the tumours are large and of conſequence. In theſe caſes, when the blood moves too ſlowly, which may be known by the pulſe, the patient muſt be allowed to eat meat, and muſt take ſuch medicines as are warm and ſtimulating, by means of which, and by the increaſed motion of the blood, the inſpiſſated particles contained in the ſmaller veſſels will be the more eaſily converted into matter. Strong broths are very proper for this purpoſe, as alſo the uſe of wine, or ale, in moderation; and venice-treacle, diaſcordium, and the confection of alkermes, are to be the medicines taken three or four times a day, and medicated teas made of ſaunders-wood, ſaſſafraſs, or cinnamon. But on the contrary, when the motion of the blood is too violent, and the heat too great, cooling medicines are to be given, ſuch as the thin and watery drinks, the ſub-acid medicines, and nitre: bleeding in a ſmall quantity is alſo often neceſſary in this caſe. But when the conſtitution is ſound, and the blood's motion regular, the uſe of internal medicines to promote ſuppuration is trifling, and may be altogether rejected.

SUPPURATIVES, or SUPPURATING MEDICINES, ſuch as promote ſuppuration. See the preceding article.

SUPPUTATION. See COMPUTATION.

SUPRACOSTALES, or LEVATORES COSTARUM, in anatomy, muſcles ſerving to reſpiration; being among thoſe that dilate the thorax for that end, and therefore reckoned among the dilatores. See the article DILATORES.

Theſe muſcles are of two kinds, being diſtinguiſhed from their figures into ſhort and long. The ſhort ones are twelve on each ſide; they have their origin from the tranſverſe proceſſes of eleven vertebræ of the back, and of one that is in the lower one of the neck, and they are inſerted into the hinder part of the ribs. The long ſupracoſtales are three or four: their origin is the ſame from the ſeventh, eighth, ninth, and tenth vertebræ, and their end in the ninth, tenth, eleventh, and twelfth ribs.

SUPRALAPSARY, in theology, a perſon who holds that God, without any regard to the good or evil works of men, has reſolved, by an eternal decree, to ſave ſome and damn others. Theſe are alſo called antelapſaries, and are oppoſed to ſublapſaries and infralapſaries.

SUPRASPINATUS, in anatomy, a muſcle thus called from its fleſhy origination at the upper end of the baſis of the ſcapula above the ſpine, to the upper part whereof it is connected, as alſo to the ſuperior edge of the ſcapula, whence marching along the upper interſcapulum,

or

er thin part of the ſcapula, which it fills, it paſſes under the acromium and articulation of the humerus. It helps to lift the arm upwards.

SUPREMACY, in our polity, the ſuperiority or ſovereignty of the king over the church as well as ſtate, whereof he is eſtabliſhed head. See KING.

The king's ſupremacy was at firſt eſtabliſhed, or, as others ſay, recovered, by king Henry VIII. in 1534, after breaking with the pope. It is ſince confirmed by ſeveral canons, as well as by the articles of the church, and is paſſed into an oath which is required as a neceſſary qualification for all offices and employments both in church and ſtate, from perſons to be ordained, from the members of both houſes of parliament, &c.

SURA, in anatomy, the calf, or fleſhy part of the leg. The word is alſo uſed by ſome for the fibula. See the article FIBULA.

SURAT, a city and port-town of hither India, in the province of Guzurat, or Cambaya, ſituated on the river Tapte, ten miles eaſt of the Indian-ſea: in eaſt long. 72° 20′, north lat. 21° 30′.

SURBATING, among farriers, is when the ſole of a horſe's foot is worn, bruiſed, or ſpoiled by beating the hoof againſt the ground in travelling without ſhoes, or going in hot ſandy lands, or with a ſhoe that hurts the ſole, lies too flat to it, or the like. Sometimes alſo it happens by over-riding a horſe while young, before his feet are hardened; and ſometimes by the hardneſs of the ground and high lifting his feet. The ſigns hereof are his halting on both fore-legs, and going ſtiffly, and creeping as if half foundered. In the general, there is nothing better for ſurbated feet than tar melted into the foot, or vinegar boiled with ſoot to the conſiſtence of a broth, and put into the foot boiling hot, with hurds over it, and ſplints to keep it in.

SURCHARGE, the ſame with overcharge, and whatever is above that which is juſt and right. Surcharge of the foreſt or a common, is when a commoner puts more beaſts in the foreſt or common than he has a right to do.

SURCINGLE, a girdle wherewith the clergy of the church of England uſually tie their caſſock. See GIRDLE.

SURCOAT, a coat of arms to be worn over the body armour. See the article COAT *of arms*.

The ſurcoat is properly a looſe thin taffaty-coat, with arms embroidered or painted on it, ſuch as is worn by heralds: antiently alſo uſed by military men over their armour, to diſtinguiſh themſelves by.

SURCULUS, in the anatomy of plants, a word uſed to expreſs that part of the branching of the ribs of a leaf, which is of a middle kind betwixt the great middle rib and the ſmalleſt reticular ramifications. The middle rib is by the writers on theſe ſubjects called petiolum. The firſt diviſion that go off laterally from theſe are called rami, or branches; the next diviſion of theſe into more minute ones, ſurculi; and the final divarications of theſe into the reticular work that ſpreads itſelf over the whole leaf, capillamenta. See PETIOLUM, &c.

SURD, in arithmetic and algebra, denotes any number or quantity that is incommenſurable to unity: otherwiſe called an irrational number or quantity.

The ſquare roots of all numbers, except 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, &c. (which are the ſquares of the integer numbers, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, &c.) are incommenſurables: and after the ſame manner the cube roots of all numbers but of the cubes of 1, 2, 3, 4, 5, 6, &c. are incommenſurables: and quantities that are to one another in the proportion of ſuch numbers, muſt alſo have their ſquare-roots, or cube-roots, incommenſurable. The roots, therefore, of ſuch numbers, being incommenſurable, are expreſſed by placing the proper radical ſign over them: thus $\sqrt[2]{2}$, $\sqrt[2]{3}$, $\sqrt[2]{5}$, $\sqrt[2]{6}$, &c. expreſs numbers incommenſurable with unity. However, though theſe numbers are incommenſurable themſelves with unity, yet they are commenſurable in power with it; becauſe their powers are integers, that is, multiples of unity. They may alſo be commenſurable ſometimes with one another, as the $\sqrt[2]{8}$ and $\sqrt[2]{2}$; becauſe they are to one another as 2 to 1: and when they have a common meaſure, as $\sqrt[2]{2}$ is the common meaſure of both; then their ratio is reduced to an expreſſion in the leaſt terms, as that of commenſurable quantities, by dividing them by their greateſt common meaſure. This common meaſure is found as in commenſurable quantities, only the root of the common meaſure is to be

be made their common diviſor: thus $\frac{\sqrt{12}}{\sqrt{3}} = \sqrt{4} = 2$, and $\frac{\sqrt{18a}}{\sqrt{2}} = 3\sqrt{a}$.

A rational quantity may be reduced to the form of any given ſurd, by raiſing the quantity to the power that is denominated by the name of the ſurd, and then ſetting the radical ſign over it: thus $a = \sqrt[2]{a^2} = \sqrt[3]{a^3} = \sqrt[4]{a^4} = \sqrt[5]{a^5} = \sqrt[n]{a^n}$, and $4 = \sqrt{16} = \sqrt[3]{64} = \sqrt[4]{256} = \sqrt[5]{1024} = \sqrt[n]{4^n}$.

As ſurds may be conſidered as powers with fractional exponents, they are reduced to others of the ſame value that ſhall have the ſame radical ſign, by reducing theſe fractional exponents to fractions having the ſame value and a common denominator. Thus $\sqrt[n]{a} = a^{\frac{1}{n}}$, and $\sqrt[m]{a} = a^{\frac{1}{m}}$, and $\frac{1}{n} = \frac{m}{nm}$, $\frac{1}{m} = \frac{n}{nm}$, and therefore $\sqrt[n]{a}$ and $\sqrt[m]{a}$, reduced to the ſame radical ſign, become $\sqrt[nm]{a^m}$ and $\sqrt[nm]{a^n}$. If you are to reduce $\sqrt[2]{3}$ and $\sqrt[3]{2}$ to the ſame denominator, conſider $\sqrt[2]{3}$ as equal to $3^{\frac{1}{2}}$, and $\sqrt[3]{2}$ as equal to $2^{\frac{1}{3}}$, whoſe indices reduced to a common denominator, you have $3^{\frac{1}{2}} = 3^{\frac{3}{6}}$, and $2^{\frac{1}{3}} = 2^{\frac{2}{6}}$, and, conſequently, $\sqrt[2]{3} = \sqrt[6]{3^3} = \sqrt[6]{27}$, and $\sqrt[3]{2} = \sqrt[6]{2^2} = \sqrt[6]{4}$; ſo that the propoſed ſurds $\sqrt[2]{3}$ and $\sqrt[3]{2}$, are reduced to other equal ſurds $\sqrt[6]{27}$ and $\sqrt[6]{4}$, having a common radical ſign.

Surds of the ſame rational quantity are multiplied by adding their exponents, and divided by ſubtracting them; thus, $\sqrt[2]{a} \times \sqrt[3]{a} = a^{\frac{1}{2}} \times a^{\frac{1}{3}} = a^{\frac{3+2}{6}} = a^{\frac{5}{6}} = \sqrt[6]{a^5}$; and $\frac{\sqrt[3]{a}}{\sqrt[5]{a}} = \frac{a^{\frac{1}{3}}}{a^{\frac{1}{5}}} = a^{\frac{1}{3}-\frac{1}{5}} = a^{\frac{5-3}{15}} = a^{\frac{2}{15}} = \sqrt[15]{a^2}$; $\sqrt[m]{a} \times \sqrt[n]{a} = a^{\frac{n+m}{mn}}$; $\frac{\sqrt[m]{a}}{\sqrt[n]{a}} = a^{\frac{n-m}{mn}}$; $\sqrt[2]{2} \times \sqrt[3]{2} = \sqrt[6]{2^5} = \sqrt[6]{32}$; $\frac{\sqrt[2]{2}}{\sqrt[3]{2}} = \sqrt[6]{2}$.

If the ſurds are of different rational quantities, as $\sqrt[n]{a^2}$ and $\sqrt[n]{b^3}$, and have the ſame ſign, multiply theſe rational quantities into one another, or divide them by one another, and ſet the common radical ſign over their product or quotient. Thus, $\sqrt[n]{a^2} \times \sqrt[n]{b^3} = \sqrt[n]{a^2 b^3}$; $\sqrt[2]{2} \times \sqrt[2]{5} = \sqrt[2]{10}$; $\frac{\sqrt[m]{a^4}}{\sqrt[m]{b^3 a}} = \sqrt[m]{\frac{a^4}{b^3 a}} = \sqrt[m]{\frac{a^3}{b^3}}$; $\frac{\sqrt[3]{9}}{\sqrt[3]{24}} = \sqrt[3]{\frac{9}{24}} = \sqrt[3]{\frac{3}{8}} = \frac{1}{2}\sqrt[3]{3}$.

If ſurds have not the ſame radical ſign, reduce them to ſuch as ſhall have the ſame radical ſign, and proceed as before; $\sqrt[m]{a} \times \sqrt[n]{b} = \sqrt[nm]{a^n b^m}$; $\frac{\sqrt[m]{a}}{\sqrt[n]{x}} = \sqrt[mn]{\frac{a^n}{x^m}}$; $\sqrt[2]{2} \times \sqrt[3]{4} = 2^{\frac{1}{2}} \times 4^{\frac{1}{3}} = 2^{\frac{3}{6}} \times 4^{\frac{2}{6}} = \sqrt[6]{2^3 \times 4^2} = \sqrt[6]{8 \times 16} = \sqrt[6]{128}$; $\frac{\sqrt[3]{4}}{\sqrt[2]{2}} = \frac{4^{\frac{1}{3}}}{2^{\frac{1}{2}}} = \frac{4^{\frac{2}{6}}}{2^{\frac{3}{6}}} = \sqrt[6]{\frac{4^2}{2^3}} = \sqrt[6]{\frac{16}{8}} = \sqrt[6]{2}$.

If the ſurds have any rational coefficients, their product or quotient muſt be prefixed; thus, $2\sqrt[2]{3} \times 5\sqrt[2]{6} = 10\sqrt[2]{18}$.

The powers of ſurds are found as the powers of their quantities, by multiplying their exponents by the index of the power required; thus the ſquare of $\sqrt[3]{2}$ is $2^{\frac{1}{3} \times 2} = 2^{\frac{2}{3}} = \sqrt[3]{4}$; the cube of $\sqrt[2]{5} = 5^{\frac{1}{2} \times 3} = 5^{\frac{3}{2}} = \sqrt[2]{125}$. Or you need only, in involving ſurds, raiſe the quantity under the radical ſign to the power required, continuing the ſame radical ſign; unleſs the index of that power is equal to the name of the ſurd, or a multiple of it, and in that caſe the power of the ſurd becomes rational. Evolution is performed by dividing the fraction, which is the exponent of the ſurd, by the name of the root required. Thus the ſquare root of $\sqrt[3]{a^4}$ is $\sqrt[3]{a^2}$ or $\sqrt[6]{a^4}$.

The

The surd $\sqrt[m]{a^m x} = a\sqrt[m]{x}$; and, in like manner, if a power of any quantity of the same name with the surd divides the quantity under the radical sign without a remainder, as here a^m divides $a^m x$, and 25 the square of 5, divides 75 the quantity under the sign in $\sqrt[2]{75}$ without a remainder; then place the root of that power rationally before the sign, and the quotient under the sign, and thus the surd will be reduced to a more simple expression. Thus $\sqrt[2]{75} = 5\sqrt[2]{3}$; $\sqrt[2]{48} = \sqrt[2]{3\times 16} = 4\sqrt[2]{3}$; $\sqrt[3]{81} = \sqrt[3]{27\times 3} = 3\sqrt[3]{3}$.

When surds are reduced to their least expressions, if they have the same irrational part, they are added or subtracted, by adding or subtracting their rational coefficients, and prefixing the sum or difference to the common irrational part.

Thus, $\sqrt[2]{75} + \sqrt[2]{48} = 5\sqrt[2]{3} + 4\sqrt[2]{3} = 9\sqrt[2]{3}$; $\sqrt[3]{81} + \sqrt[3]{24} = 3\sqrt[3]{3} + 2\sqrt[3]{3} = 5\sqrt[3]{3}$; $\sqrt[2]{150} - \sqrt[2]{54} = 5\sqrt[2]{6} - 3\sqrt[2]{6} = 2\sqrt[2]{6}$; $\sqrt{a^2 x} + \sqrt{b^2 x} = a\sqrt{x} + b\sqrt{x} = \overline{a+b}\times\sqrt{x}$.

Compound surds are such as consist of two or more joined together; the simple surds are commensurable in power, and by being multiplied into themselves, give at length rational quantities; yet compound surds multiplied into themselves, commonly give still irrational products. But, when any compound surd is proposed, there is another compound surd which, multiplied into it, gives a rational product. Thus if $\sqrt{a} + \sqrt{b}$ were proposed, multiplying it by $\sqrt{a} - \sqrt{b}$, the product will be $a - b$.

The investigation of that surd, which multiplied into the proposed surd, gives a rational product, is made easy by three theorems, delivered by Mr. Maclaurin, in his Algebra, p. 109, seq. to which we refer the curious.

This operation is of use in reducing surd expressions to more simple forms. Thus suppose a binominal surd divided by another, as $\sqrt[2]{20} + \sqrt[2]{12}$, by $\sqrt[2]{5} - \sqrt[2]{3}$, the quotient might be expressed by $\frac{\sqrt{20}+\sqrt{12}}{\sqrt{5}-\sqrt{3}}$. But this might be expressed in a more simple form, by multiplying both numerator and denominator, by that surd, which multiplied into the denominator, gives a rational product: thus, $\frac{\sqrt{20}+\sqrt{12}}{\sqrt{5}-\sqrt{3}} = \frac{\sqrt{20}+\sqrt{12}}{\sqrt{5}-\sqrt{3}}\times\frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}+\sqrt{3}} = \frac{\sqrt{100}+2\sqrt{60}+6}{5-3} = \frac{16+2\sqrt{60}}{2} = 8 + 2\sqrt{15}$. To do this generally, see Maclaurin, lib. cit. p. 113.

When the square root of a surd is required, it may be found, nearly, by extracting the root of a rational quantity that approximates to its value. Thus to find the square root of $3+2\sqrt{2}$, first calculate $\sqrt{2} = 1{,}41421$. Hence $3+2\sqrt{2} = 5{,}82842$, the root of which is found to be nearly 2,41421.

In like manner we may proceed with any other proposed root. And if the index of the root, proposed to be extracted, be great, a table of logarithms may be used. Thus $\sqrt[7]{5+\sqrt{17}}$ may be most conveniently found by logarithms.

Take the logarithms of 17, divide it by 13; find the number corresponding to the quotient; add this number to 5; find the logarithm of the sum, and divide it by 7, and the number corresponding to this quotient will be nearly equal to $\sqrt[7]{5+\sqrt{17}}$.

But it is sometimes requisite to express the roots of surds exactly by other surds. Thus, in the first example, the square root of $3+2\sqrt{2}$ is $1+\sqrt{2}$: for $\overline{1+\sqrt{2}}\times\overline{1+\sqrt{2}} = 1+2\sqrt{2}+2 = 3+2\sqrt{2}$. For the method of performing this, the curious may consult Mr. Maclaurin's Algebra, p. 115, seq. where also rules for trinomials, &c. may be found.

SURDESOLID, or SURSOLID. See the article SURSOLID.

SURETY, in law, generally signifies the same with bail. See the article BAIL.

There is also a surety of the peace, whereby a person, in danger of hurt from another, is secured by a bond or recognizance of the offending party, and his sureties entered into to the king, and taken by a competent judge of record, &c.

SURFACE, or SUPERFICIES. See the article SUPERFICIES.

SURFEIT, in medicine, a ſickneſs proceeding from the ſenſation of a load at the ſtomach, uſually attended with eruptions, and ſometimes with a fever.

Surfaces may be cauſed, ſays Dr. Shaw, 1. By voracity; from whence the ſtomach and inteſtines are overcharged, digeſtion weakened, and the chyle rendered crude or viſcid, and the blood corrupted. If what was thus devoured were high ſeaſoned or inflammatory, or happens to lie long in the body, it is ſuppoſed to cauſe a fever alſo. 2. By drinking of ſmall liquors in hot weather, or when the body is heated by exerciſe; which, perhaps, chills the fluids, and gives a check to perſpiration; from whence alſo may ariſe a fever and eruptions. Summer fruits likewiſe, as cucumbers, apples, cherries, &c. may have the ſame effect. 3. By too great exerciſe or heat, whence the fluids are rarified and thrown into too rapid a circulation, which being ſuddenly ſtopped, as may happen by cooling too faſt, there enſues alſo a ſtoppage of perſpiration. 4. By the ſtate or ſome change of the air; as by blaſts, or vehemently hot and ſultry weather, or cold winds giving a ſudden check to, and preventing, perſpiration. See PERSPIRATION.

Eruptions may not appear in ſurfeits, either by reaſon of the ſlightneſs of the cauſe, or ſome wrong management at the firſt. Nauſea's, oppreſſion, ſickneſs, and ſometimes a vomiting and a fever, but ſeldom eruptions, attend on an overloaded ſtomach. This ſpecies of a ſurfeit is called crapula; ſickneſs, gnawing at the ſtomach, ſometimes eruptions and a fever attend ſurfeits, from the bad quality of any thing uſed as food. The fever always decreaſes as the eruptions increaſe; and if theſe ſuddenly diſappear, the fever increaſes. Thoſe ſurfeits, which proceed from too great exerciſe, or too ſudden cooling after it, appear with ſickneſs, a fever and eruptions, though the two laſt ſymptoms may be wanting. Thoſe cauſed from ſome alteration in the air, and vulgarly called blaſts, appear with redneſs of the face, ſpots, and a fever, often with bliſters on the ſkin. See FEVER.

SURGE, in the ſea-language, the ſame with a wave. See WAVE.

Alſo when heaving at the capſtan, if the cable royal, or meſſenger ſlip a little, they call it ſurging.

SURGERY, or CHIRURGERY, χειρουργικη, the art of curing all manner of wounds, and other diſorders, where the application of the hand, aſſiſted by proper inſtruments, is neceſſary.

Surgery, or manual operation, is highly beneficial to mankind, ſince by means hereof many grievous diſorders are relieved, as wounds, fractures, luxations, ulcers, &c. where diet and medicine would afford very little, and ſometimes no help at all. See the articles WOUND, FRACTURE, &c.

Surgery, ſays Celſus, is that branch of phyſic which informs us how to cure or prevent diſorders, by the aſſiſtance of our hands or inſtruments, or by the application of external remedies: thus diſorders are often prevented by bleeding, ſcarifying, iſſues, ſetons, &c. See the articles PHLEBOTOMY, SCARIFICATION, &c.

A thorough knowledge in anatomy is abſolutely neceſſary for a ſurgeon, otherwiſe his actions are always uncertain, and ever obnoxious to a multiplicity of dangers. He ought alſo to be expert in the art of managing his hands and inſtruments dexterouſly in the performance of ſuch operations as any caſe may require; as amputation, lithotomy, extirpation, cauterizing, &c. See the articles AMPUTATION, LITHOTOMY, &c.

In the days of Hippocrates, ſurgery was ſo connected with medicine, that the former was ſcarce diſtinguiſhed from the latter by any peculiar and diſcriminating name: and that Hippocrates himſelf aſſiſted the ſick, by manual operation, is a fact which cannot be called in queſtion. During theſe laſt fifty years, ſurgery has been cultivated with very great ſucceſs. M. le Dran has furniſhed us with inſtructions which will inform the moſt ſkilful proficients. M. de la Faye, the ingenious commentator on Dionis, has likewiſe given us, in his notes, not only what his own experience and reflections have ſuggeſted, but alſo, as he ſays, the opinions and obſervations of the greateſt ſurgeons at Paris; and indeed the frequent mention he makes of Meſſ. Morand, Petit, de la Peyronie, and others, are ſufficient proofs that his comments are an exact repreſentation of the preſent ſtate of ſurgery in France. M. Garengeot's treatiſe on the operations of ſurgery, lies under the diſadvantage of having been publiſhed ſome years ſince, and before many of thoſe improvements were made, which are now univerſally known: it, however, contains ſeveral caſes and remarks

remarks well worth the attention of a ſtudious reader. Heiſter's ſurgery is in every body's hands, and the character of Heiſter is ſo well eſtabliſhed, that any account of that work is needleſs. Nor need we mention the treatiſe of ſurgery, and critical enquiry, of the ingenious Mr. Sharp, ſince the name of the author is abundantly ſufficient. If the reader deſires a more particular account of chirurgical authors, we refer him to the article OPERATION, to Heiſter's Surgery, and to Dr. James's Medical Dict. under the article CHIRURGIA, where he will find a very large catalogue of them.

SURIANA, in botany, a genus of the *pentandria-pentagynia* claſs of plants, the corolla of which conſiſts of five petals, obverſely ovated, patent, and of the length of the cup: there is no pericarpium except the cruſts of the ſeeds, which are five in number, and roundiſh. It is a native of South America.

SURINAM, the capital of the dutch ſettlements in Guiana, in South America: weſt long. 56°, and north lat. 6° 30′.

SURMOUNTED, in heraldry, is when one figure is laid over another. As the pile ſurmounted of a chevron in plate CCLX. fig. 2.

SURNAME, or SIRNAME, a name added to the proper or baptiſmal name, to denote the perſon of ſuch a family.

SURREBUTTER, in law, a ſecond rebutter, or the replication of the plaintiff to the defendant's rebutter.

SURREJOINDER, is a ſecond defence of the plaintiff's declaration by way of anſwer to the defendant's rejoinder.

SURRENDER, in common law, an inſtrument in writing, teſtifying, that the particular tenant of lands and tenements for life or years, doth ſufficiently conſent and agree, that he who has the next or immediate remainder or reverſion thereof, ſhall have the preſent eſtate of the ſame in poſſeſſion, and that he thereby yields and gives up the ſame to him.

A ſurrender may not be made of eſtates in fee, nor of rights and titles only; neither can one termor regularly ſurrender to another. For it is ordained by ſtatute, that no eſtate of freehold, or term for years, ſhall be granted or ſurrendered but by deed in writing, ſigned by the parties, or by operation at law, *&c.* See the article DEED.

Beſides the uſual ſurrender at common law, there is a cuſtomary ſurrender of copyhold lands, and likewiſe a ſurrender of letters-patent to the king, in order that he may grant the eſtate to whom he thinks meet.

SURREPTITIOUS, or SUBREPTITIOUS. See SUBREPTITIOUS.

SURREY, a county of England, bounded by the river Thames, which ſeparates it from Middleſex, on the north; by Kent, on the eaſt; by Suſſex, on the ſouth; and by Berkſhire, on the weſt; being thirty-four miles long, and twenty-one broad.

SURROGATE, in law, denotes a perſon that is ſubſtituted, or appointed, in the room of another; and moſt commonly of a biſhop, or of his chancellor.

SURSISE, in law, a name eſpecially uſed for ſuch penalties and forfeitures, as are impoſed upon thoſe perſons that do not duly pay their duties or rent for caſtleward, in the caſtle of Dover.

SURSOLID, or SURDESOLID, in arithmetic and algebra, the fifth power, or fourth multiplication of any number or quantity conſidered as a root. See ROOT.

SURSOLID PROBLEM, in mathematics, is that which cannot be reſolved but by curves of a higher nature than a conic ſection, *v. gr.* in order to deſcribe a regular endecagon, or figure of eleven ſides in a circle, it is required to deſcribe an iſoſceles triangle on a right line given, whoſe angles at the baſe ſhall be quintuple to that at the vertex; which may eaſily be done by the interſection of a quadratrix, or any other curve of the ſecond gender. See the articles CURVE and QUADRATRIX.

SURVEY, in law, is the aſcertaining not only the boundaries and royalties of a manor, or eſtate in lands; but alſo the tenure of the reſpective tenants, and the rent and value of the ſame. In this laſt ſenſe, it is taken for a court; becauſe on the failing of an eſtate, conſiſting of manors, to a new lord, where there are tenants by leaſe, and copyholders, a court of ſurvey is generally held; and ſometimes upon other occaſions, to appriſe the lord of his right and intereſt.

SURVEYING, the art or act of meaſuring land; that is, of taking the dimenſions of any tract of ground, laying down the ſame in a map or draught, and finding the content or area thereof.

Surveying, called alſo geodæſia, is a very antient art; it is even held to have been the firſt or primitive part of geometry, and that which gave occaſion to, and laid the foundation of all the reſt. See the article GEOMETRY.

Surveying conſiſts of three parts or members; the firſt is the taking of the neceſſary meaſures, and making the neceſſary obſervations on the ground itſelf: the ſecond, is the laying down of theſe meaſures and obſervations on paper: and the third, the finding the area or quantity of ground thus laid down.

The firſt is what we properly call ſurveying: the ſecond we call plotting or protracting, or mapping: and the third caſting up. The firſt, again, conſiſts of two parts, *viz.* the making of obſervations for the angles, and the taking of meaſures for the diſtances. The former of theſe is performed by ſome one or other of the following inſtruments, *viz.* the theodolite, circumferentor, ſemicircle, plain table, or compaſs: the deſcription and manner of uſing each whereof, ſee under its reſpective article. The latter is performed by means either of the chain or the perambulator: the deſcription and manner of applying each whereof, ſee under its reſpective article.

It is uſeful in ſurveying to take the angles which the bounding lines form with the magnetic needle, in order to check the angles of the figure, and to plot them conveniently afterwards.

Large maps, repreſenting conſiderable extents of ground, are ſubject to a good many inconveniencies, eſpecially if carried into the fields, to be compared with them; ſuch maps become very troubleſome in the wind, and it is difficult to find out the part you want. To remedy this, a general and ſmall map of the manor, or county, *&c.* ſhould be firſt made on one ſheet of paper, the ſeveral parts may be ſet off on other ſeparate ſheets, and the general map being divided into as many ſquares as there are of theſe particular ſheets, the relation of the whole to the ſeveral parts is eaſily ſeen; and all theſe maps may then be bound up in a book.

The ſecond branch of ſurveying is the plotting or laying down upon paper, the ſeveral ſides and angles of the figure ſurveyed; the manner of doing which has already been explained under the article plotting. See PLOTTING.

However, it is proper to obſerve, that if the lands to be plotted are hilly, and not in any one plane, the lines meaſured cannot be truly laid down on paper, without being reduced to one plane, which muſt be the horizontal, becauſe angles are taken in that plane.

In viewing objects, if they have much altitude or depreſſion, either write down the degree and decimal, ſhewn on the double ſextant, or the links, ſhewn on the back ſide, which laſt ſubſtracted from every chain in the ſtation-line, leaves the length in the horizontal plane; but if the degree is taken, the following table will ſhew the quantity.

A table of the links to be ſubſtracted out of every chain in hypothenuſal lines of ſeveral degrees, altitude, or depreſſion, for reducing them to horizontal.

deg.	links.	deg.	links.	deg.	links.
4.05	¼	14.07	3	23.074	8
5.73	½	16.26	4	24.495	9
7.02	¾	18.195	5	25.84	10
8.11	1	19.95	6	27.13	11
11.48	2	21.565	7	28.36	12

Let the firſt ſtation-line really meaſure 1107 links, and the angle of altitude, or depreſſion, be 19° 95′; looking in the table, I find 19° 95′ is 6 links; now 6 times 11 is 66, which ſubtracted from 1107 leaves 1041, the true length to be laid down.

The third branch conſiſts in reducing the ſeveral diviſions, incloſures, *&c.* into triangles, ſquares, trapeziums, parallelograms, *&c.* but eſpecially triangles; and finding the areas or contents of theſe ſeveral figures. See the articles AREA, SUPERFICES, *&c.*

SURVEYING *a harbour.* This being an extremely uſeful, and, at the ſame time, difficult part of ſurveying; it will be proper to ſhew not only in what manner the obſervations ſhould be made, but how the plan or draught is to be plotted, or laid down on paper.

With reſpect to the obſervations, it will be requiſite, 1. To get as diſtinct an idea as poſſible of the place to be ſurveyed; for which purpoſe it will be neceſſary, before the work is begun, to walk ſeveral times along the coaſt, carefully obſerving the ſeveral particulars neceſſary to be taken notice of. 2. Having acquired an idea of the place, ſignals muſt be erected at every angle, *&c.* as at C, D, E, F, G, H, and I (plate CCLXIV.) alſo at the ends of the ſands, *&c.* as at Q, S, T, V, W, X, Y, and Z. And when you are at the point Q, erecting the ſignal, obſerve what objects on the land are in a right-line, which are the windmill at *t* and the church at K, which objects muſt be inſerted in your map as a mark for ſhips

to

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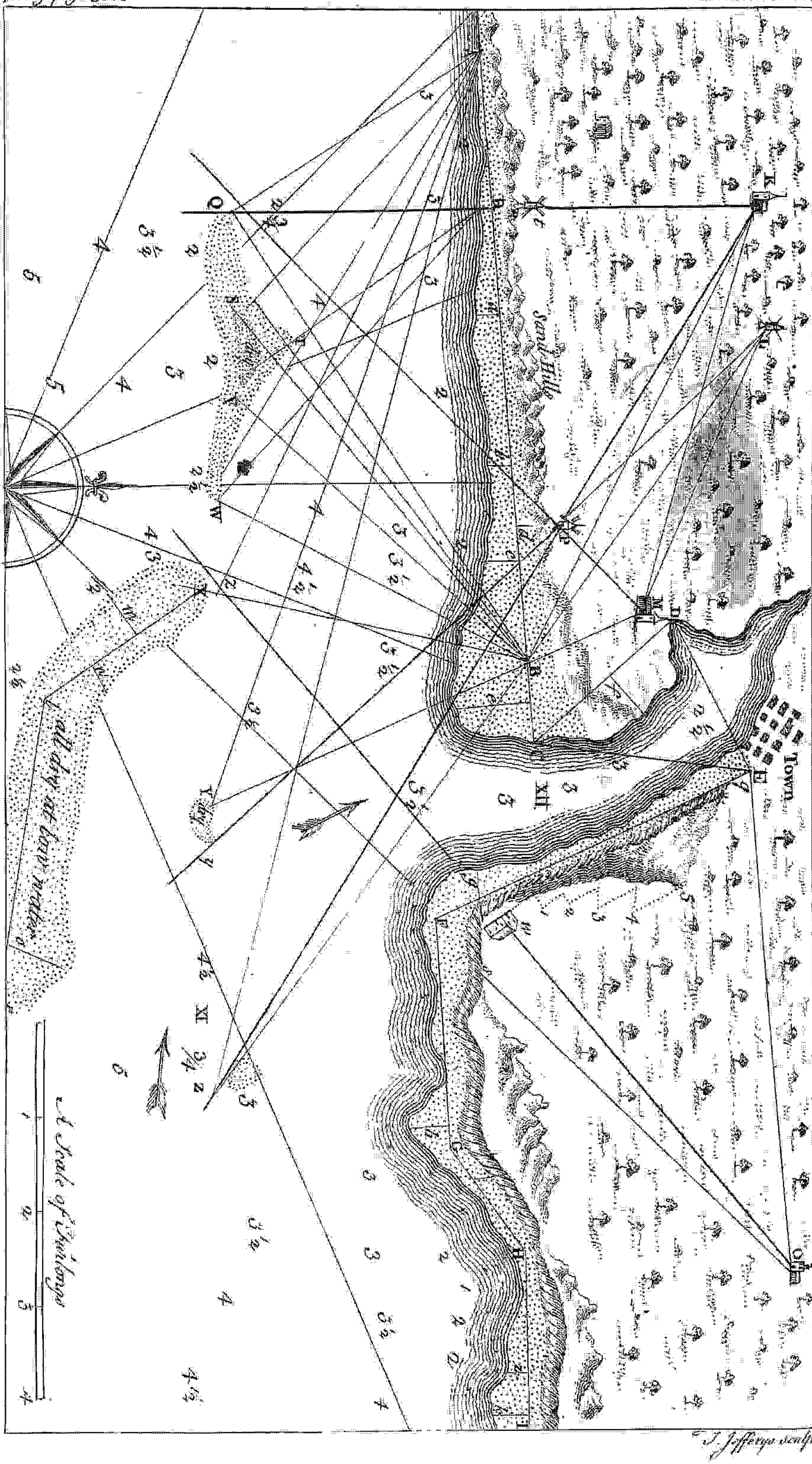


J. Jefferys sculp.

to avoid the ſand Q T W. Likewiſe, when you are in the midſt of the channel between the ends of the ſands W and X, obſerve what objects are in a direct line, which are the houſe at *w* and the church at O. In like manner, when you are at *y*, the two windmills at P and L will be in a right-line, as will the windmill at P and the church at K when you are at Z. Theſe objects you muſt be careful to inſert in your map; and, if there be none that will anſwer the intention, ſome ought to be erected. 3. The ſignals, &c. being erected, place your inſtrument at A, and obſerve the bearing of the ſignal at C; alſo the ſeveral angles comprehended between the lines A Q, A S, A T, A Y, and A Z, and the line A C. And becauſe the object at X will be in a right-line with that at T, therefore the angle will be the ſame. 4. Meaſure along the line A C with your chain or perambulator, and, when you come to R, note down the diſtance from A to R; and, fixing your inſtrument in the ſame ſituation as at A, obſerve the angles intercepted between the lines R V and R W and the line R C. And becauſe the windmill at *t* is in a perpendicular direction to the line A C in the point R, meaſure the diſtance from thence to that windmill, noting it down alſo in your book. 5. Continue the meaſuring of the line A C from R towards C, obſerving, if the edge of the water is not parallel to the line A C, to meaſure the diſtance in a perpendicular direction, as the ſmall perpendiculars *a*, *b*, *c*, &c. but be ſure to remark the diſtance ſuch perpendiculars are from the point A, or firſt ſtation. Alſo, when you perceive that the windmill at P is in a perpendicular direction to the line A C, meaſure the diſtance *d* P. 6. When you have meaſured to B, fix your inſtrument there in the ſame poſition as at A, and obſerve the angles which the lines B Y and B Z form with the line B C. Then turn the inſtrument about (the index being fixed at the beginning of the graduations) till through the ſights you ſee the object at A; and fix the inſtrument by the ſcrew in that poſition; then obſerve the angles comprehended between the line B A and the lines B X, B W, B V, B S, B T, and B Q. Alſo turning about the braſs-limb of the inſtrument (the index being fixed at the beginning of the graduations) till the two ſights be in a right-line with the object at A; and, faſtening the inſtrument in this poſition, take the angles intercepted between the line B A and the lines B M, B L, and B K, and meaſure the diſtance B M. 7. Having meaſured the whole line A C, fix your inſtrument at C in the ſame poſition as before, and take the angles B C D, and D C E, meaſuring the diſtance C D and the perpendicular *f*. 8. Remove your inſtrument to D, and take the angle C D E; that is, place the inſtrument at D; and, having fixed the index at the beginning of the graduations, turn the inſtrument about till you perceive through the ſights the object at C, and fix the inſtrument in that poſition; then move the index, till you ſee through the ſights the object at E, and the degrees cut by the index will be the angle required. 9. Remove the inſtrument to M, and take the angles K M B and K M L after the preceding manner. 10. Having obſerved the angles and meaſured the diſtances requiſite on the weſt ſide of the harbour, remove your inſtrument to the other ſide and plant it at E, obſerving the bearing of the line E F, meaſuring its diſtance, together with that of the perpendicular *g*, in all reſpects as before; as alſo the lines F G, G H, H I, and their perpendiculars *b i k*, continuing the perpendicular *h* to the end of a ledge of rocks lying off that point. 11. Becauſe the cleft will interrupt your ſight from the church at O, therefore you muſt place your inſtrument on the top of the cleft at *q*, and take the bearing of the church; and either meaſure the diſtance from your inſtrument to it, or elſe remove your inſtrument thither, and, having placed ſignals at *q* and *s*, take the angle *q* O *s*. 12. Remove your inſtrument at low-water to the ſand at X, taking the bearings, and meaſuring the diſtances of the lines X *l* and *l r*, together with the perpendiculars *m*, *n*, *o*.

Having finiſhed your obſervations, proceed to conſtruct your map in the following manner.

1. Draw the eaſt and weſt line B A, ſetting off on it the ſeveral diſtances, *viz.* from A to R, A to *a*, &c. then by drawing the ſeveral perpendiculars, and making them of their proper lengths, you may eaſily draw the track of the ſurface of the water, and thoſe which are above the line will give the places where the ſeveral objects are to be delineated.

2. By the help of your protractor or line of chords, make the ſeveral angles at A and

and R, equal to their reſpective number of degrees, *&c.* drawing a right-line through each, which continue at pleaſure.

3. Conſtruct the angles at B in the ſame manner, continuing the right-lines from this ſtation till they cut thoſe projected from A and R, which will be the true places of thoſe objects; whence the ſands Q, Y, and Z may be eaſily drawn.

4. By projecting the angle ABM, and ſetting off on the line BM its proper diſtance, you will have the place where that church muſt be delineated.

5. Conſtruct the angles BCD and DCE, continuing the line CE at pleaſure, and ſet off its proper length on the line CD; then, by drawing the perpendicular *f* of its proper length, you may draw that part of the harbour between C and D.

6. Conſtruct the angle at D, continuing the line DE till it cuts CE in E, which will give the place of the ſtation at E.

7. By conſtructing the angles ABK, ABL, BMK, and KML; and continuing the lines BK, BL, MK, and ML, till they cut each other in K and L; you will have the ſituation of the objects at K and L.

8. Proceed in the ſame manner on the other ſide of the harbour, by projecting the lines EF, FG, GH, and HI, according to their ſeveral bearings, *&c.* and by drawing the ſeveral perpendiculars of their true length, the track of the ſurface of the water on the eaſt ſide of the harbour may be delineated; alſo, by continuing the perpendicular *b*, you will have the ſituation of the ledge of rocks lying off that point.

9. Obſerve to draw the appearance of the land; that is, from A to *d*, the ſand-hills which lie along above the high-water mark, and the cleft which ſtretches all along the eaſt ſide of the harbour.

10. In ſome convenient place draw the compaſs, but let it be in its true poſition without any variation; that is, obſerve to allow for the variation, if any, which muſt alſo be done before you begin your projection.

11. Draw the lines Q*t*K, QPM, *z w* O, *y*PL, and ZPK, which will ſhew the marks neceſſary to be obſerved by ſhips in coming into the harbour.

12. At low-water go off in your boat, and ſound the depth of the water in various places, which inſert in your map; and obſerve the ſetting of the tide, which you muſt repreſent by darts. Alſo the time of high-water at the full and change of the moon, muſt be inſerted in roman numbers.

13. Laſtly, in ſome convenient place of your map inſert a ſcale, of the ſame length of that which you made uſe of in the projection.

SURVEYOR, a perſon who hath the overſight and care of conſiderable works, lands, or the like.

Such are the ſurveyor-general of the king's manors, ſurveyor of the king's exchange, ſurveyor-general of the works, ſurveyor-general of the crown lands, *&c.*

SURVEYOR *of the melting*, is an officer of the mint, whoſe office is to ſee the bullion caſt out, and that it be not altered after the delivery of it to the melter.

SURVEYOR *of the navy*, an officer whoſe buſineſs is to know the ſtate of all ſtores, and ſee the wants ſupplied; to ſurvey the hull, maſts, and yards of ſhips; to audit the boatſwain's and carpenter's accounts, *&c.*

SURVEYOR *of the ordnance*, is an officer whoſe charge is to ſurvey all the king's ordnance, ſtores, and proviſions of war, in cuſtody of the ſtore-keeper of the Tower of London; to allow all bills of debts; to keep checks on labourers and artificers work, *&c.*

SURVEYOR likewiſe denotes a gauger; as alſo a perſon who ſurveys lands, and makes maps of them.

SURVIVOR, in law, ſignifies the longeſt liver of joint-tenants, or of any two perſons, jointly intereſted in a thing; in which caſe, if there be only two joint-tenants, upon the death of one, the whole goes to the ſurvivor: and if there be more than two, the part of the deceaſed is divided among all the ſurvivors.

SUS, the HOG-KIND, in zoology. See the article HOG.

SUS, in geography, a province of the empire of Morocco, lying on the Atlantic ocean, ſouth of Morocco proper: its chief towns are Taradant and Tafilet.

SUSA, a fortified town of Piedmont, in Italy, ſituated on the river Doria, on the confines of France, eighteen miles north of Turin.

SUSDAL, a city of the province of Moſcow, in Ruſſia, one hundred miles north-eaſt of Moſcow.

SUSPENCE, in law, is held to be a temporary ſtop of a perſon's right; and takes place where a rent or other profit iſſuing out of land, on account of the unity of poſſeſſion of the rent, *&c.* and of the land, whereout it iſſues, is not in eſſe for a time;

a time; but ſo as it may be revived afterwards, wherein it differs from extinguiſhment. See EXTINGUISHMENT.

SUSPENSION, or *Points of* SUSPENSION, in mechanics, are thoſe points in the axis or beam of a ballance, wherein the weights are applied, or from which they are ſuſpended.

In a law-ſenſe, ſuſpenſion is a ſpecies of cenſure, whereby eccleſiaſtical perſons are forbidden to exerciſe their office, or to take the profits of their benefices; or when they are prohibited in both of them for a certain time, either in whole or in part. Suſpenſion is alſo ſaid to relate to the laity, *viz. ſuſpenſio ab ingreſſu eccleſiæ, i. e.* from hearing divine ſervice, See the article EXCOMMUNICATION.

SUSPENSION *of arms*, in war, a ſhort truce agreed on by both armies, in order to bury the dead, wait for freſh inſtructions, or the like.

SUSPENSION, in rhetoric, is the carrying on a period or diſcourſe, in ſuch a manner as to keep the reader in expectation of ſomething conſiderable in the concluſion. But great care muſt be taken, that the reader's expectation be not diſappointed; for nothing is more contemptible, than to promiſe much and perform little; or to uſher in an errant trifle, with the formality of preface, and ſolemn preparation.

SUSPENSOR, in anatomy, the ſame with the cremaſter-muſcle. See CREMASTER.

SUSPICION, in law. Perſons may be taken up upon ſuſpicion, where a felony is committed, *&c.* however, there muſt be at leaſt ſome reaſonable grounds for the ſame.

SUSSEX, a county of England, bounded by Surrey and Kent on the north, by another part of Kent on the eaſt, by the Engliſh channel on the ſouth, and by Hampſhire on the weſt: being ſixty-five miles long, and twenty-nine broad.

SUSTERN, a town of Weſtphalia, in Germany, ten miles ſouth of Roermonde.

SUTHERLAND, a ſhire of Scotland, bounded by Cathneſs on the north, by the German ſea on the eaſt, by Roſsſhire on the ſouth, and by the Caledonian ocean on the weſt and north-weſt.

SUTTON-COLEFIELD, a market-town, twenty miles north-weſt of Warwick.

SUTTON'S QUADRANT. See QUADRANT.

SUTURE, *ſutura*, in anatomy, a kind of articulation peculiar to the cranium, or ſkull. See the article SKULL.

SUTURE, in ſurgery, a method of uniting the lips of wounds. See WOUND.

Sutures differ, according to the difference of wounds, but may be generally divided into the dry, bloody, and compound ſutures.

1. The dry ſuture, called alſo the baſtard ſuture, is only the application of ſticking plaſters, to keep the lips of the wound united: it may be uſed in ſlight wounds, and eſpecially when they happen in the face; or, indeed, wherever it is capable of keeping the lips of the wound together: and as it gives no freſh pain, and occaſions no ſcar, it is much fitter for wounds of the face than the needle. The plaſters which are to form the dry ſuture, ſhould be of a ſufficient length, and ſhaped like the part to which they are to be applied, ſo as to ſurround the greateſt part of it, but not the whole, leſt they ſhould retard the circulation of the blood, and bring on tumours and miſchiefs of that kind: they muſt be alſo ſuch as will ſtick very faſt; the diachylon if good, or the common ſticking plaſter, are fitteſt for this purpoſe. The hæmorrhage being well ſtopped, and the wound well cleanſed, ſome vulnerary balſam of the gummy kind, as the balſam of Peru, or the like, is to be applied, and over all a ſticking plaſter is to be laid, adapted to the ſize of the part. Two or more of theſe may be applied, as occaſion ſhall require, leaving a ſpace between; and they are to be ſecured in their place, by the application of proper bolſters and bandages.

Petit's method of making the ſuture of this kind, is by letting the plaſters have one, two, or more openings in the middle, through which the ſurgeon may diſcover, as by the ſpaces left between in the former method, whether the lips of the wound are properly united, or not; and may alſo be able to apply proper remedies to the part, without removing the plaſters. Theſe plaſters are applied in the ſame manner as the former, and left on till the cure is completed.

But there is yet alſo another manner of performing the dry ſuture, *viz.* ſpread two plaſters upon ſtrong cloth, anſwering in ſize to the wound; to the ſides or margins of theſe, faſten three or four tape-ſtrings, according to the length of the wound; and then, after warming the plaſters, apply them at each ſide of the wound, at about a finger's breadth from it; after this, bring the lips of the wound together; dreſs it as in the former method,

thod, and, while an aſſiſtant keeps the lips of the wound together in a proper ſituation, tie the ends of the tapes, firſt in a ſingle, and afterwards in a ſlip-knot, to keep the parts in contact; over each of theſe ſhould be laid an oblong compreſs, and over all a large ſquare one, and the whole kept on by a proper bandage. The day following, the wound is to be again examined, and if the tapes are looſened, they muſt be drawn tighter again; but if they are not looſened, let them remain untouched, and only moiſten the part with a few drops of balſam, and cover them up again with the compreſſes and bandages, as before. Some, inſtead of the tape, uſe claſps of braſs, or ſteel; but this method is much leſs convenient than the former, and therefore is little uſed.

2. The bloody or true ſuture is the uniting the lips of the wound, by means of a needle and thread: for, in large wounds, eſpecially tranſverſe ones, as their lips cannot be kept in their ſituation by means of the dry ſuture, which is frequently the caſe in wounds of the thigh, or in the abdomen, nates, or arms; or when pieces hang from the wounded part, as often happens in wounds of the forehead, cheeks, noſe, or ears; or when wounds are large, and made in an angular or cruciform manner, the needle muſt be uſed, to bring their lips together; and this is called the bloody or the true ſuture.

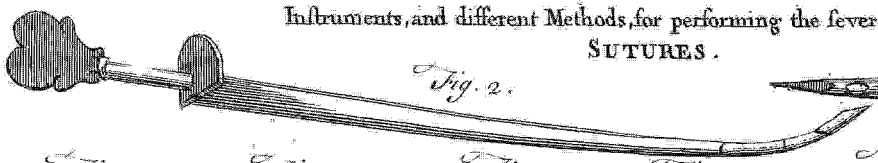
To this kind of ſuture belong the interrupted ſuture, the glover's ſuture, and the twiſted ſuture: the laſt of theſe is ſeldom uſed, but in caſes of the hare-lip; and the ſecond only in wounds of the inteſtines; but the firſt is in common uſe for all wounds which require the true or bloody ſuture.

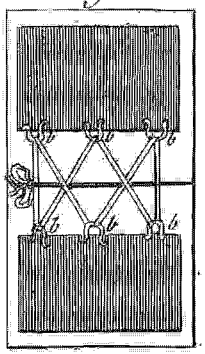
The beſt method of making the common or interrupted ſuture, is this: take a double thread, well waxed, paſs it thro' a ſtrong crooked needle; when the lips of the wound are brought together, and held firm in their proper ſituation, by an aſſiſtant, with one ſtroke pierce through them both, paſſing the needle through the lower lip from without inwards, almoſt to the bottom, and ſo on from within outwards, obſerving to make the punctures at a finger's breadth diſtance from the wound, which in this caſe we will ſuppoſe to be in length two fingers, varying this diſtance according to the ſize of the wound. After taking off the needle, tie the ends of the thread firſt in a ſingle knot, and then in a ſlip-knot, covering all with the ſame dreſſings as are uſed in the dry ſuture. But if the wound be ſo large, that one ſtitch will not be ſufficient, then two or more are to be made, according to the length of it, at about a finger's breadth diſtance one from the other. To prevent the knots from bringing on any miſchief, lay a ſmall linnen-compreſs over the ſingle knot, and make the ſlip-knot over that; which, if any pain or inflammation ſhould ſucceed, may be afterwards eaſily looſened at pleaſure.

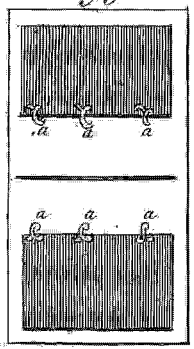
This is the method to be obſerved in ſtrait, oblique, or tranſverſe wounds; but where there are angles, as in a triangular wound, you are to proceed in the ſame manner, but obſerve to let the ſuture begin at the angle, and the other ſtitches to be taken about the middle, both ways; but if the wound be quadrangular, or have two angles, like the greek letter π, which ſometimes happens in the face, then the ſutures muſt be made in both the angles; and when the wound is ſo large, that theſe are not ſufficient, then as many more as are neceſſary muſt be made in the mid way between them. When you meet with a cruciform wound, and the lips of it cannot be kept together by the uſe of plaſters, the bloody ſuture muſt be made, by paſſing the needle through the lips, near the end of each extremity of the wound; and when all the ſtitches are thus made, the threads muſt be tied as in the other caſes.

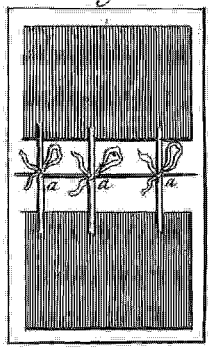
3. A kind of bloody ſuture, which requires other aſſiſtances beſides the needle and thread. It was preferred by the antient ſurgeons to the common or interrupted ſuture, becauſe it prevented the lips of the wound from being lacerated, which ſometimes happened when the other method was uſed, and not only prevented the wound from uniting, but frequently brought on other grievous diſorders; and though this method has of late years been rejected, and particularly by Dionis, in his Surgery, yet many ſtill prefer it, in ſeveral caſes, to the common interrupted ſuture: but inſtead of the pieces of wood, uſed by the antients, thoſe, who now practiſe it, uſe pieces of plaſter, rolled up in a cylindrical form, of the length of the wound, and of about the ſize of a gooſe-quill, from whence it is called by ſome the quilled ſuture. This method prevents tumours, pain, and inflammations, which might be

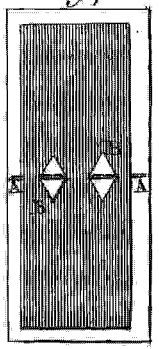
Instruments, and different Methods, for performing the several kinds of SUTURES.

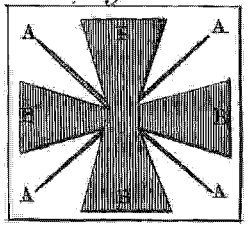


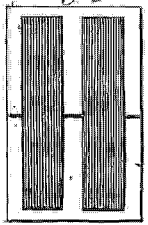


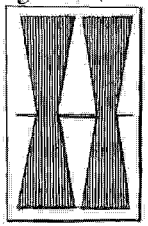


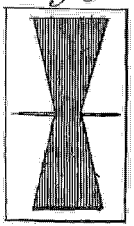


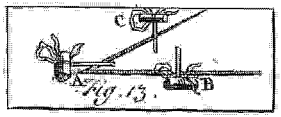


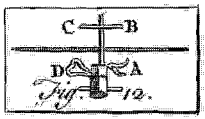


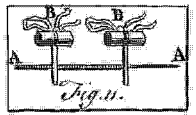


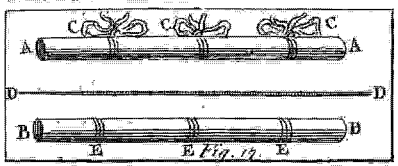


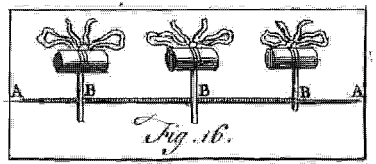


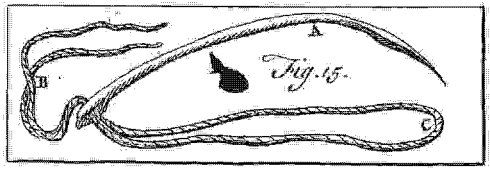


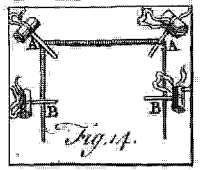


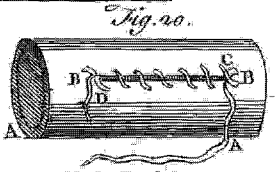


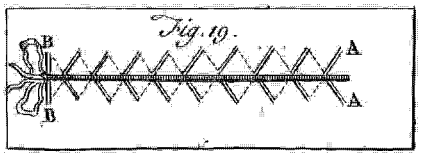


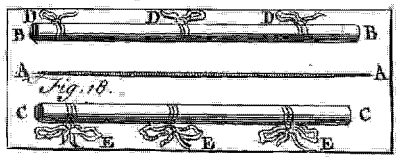












brought on by the hardneſs and preſſure of wood.

Palfynus performs this operation, in deep wounds of the muſcular parts, with a large and ſtrong crooked needle, furniſhed with a double thread well waxed, which has alſo a bow at one end. The needle thus fitted, being paſſed through both lips of the wound, in the ſame manner as in the other operations of the true ſuture, and afterwards a ſecond, and a third, paſſed in the ſame manner, a roll of plaſter is to be introduced into the bow-ends of the thread, which are left hanging out; then, when the needle is taken out at the other ſide, another roll of plaſter is to be placed between the ends of the thread; and the lips of the wound being brought together, theſe ends are to be gently tied over the roll, firſt in a ſingle, and then in a ſlip-knot: if there are three threads, the middle one ſhould be tied firſt, and then the reſt.

But, in order to illuſtrate this important article of ſurgery, we have given a plate (CCLXV.) of the inſtruments, and different methods, for performing the ſeveral kinds of ſutures; where fig. 1. is Petit's triangular needle. Fig. 2. is Heiſter's improvement of Petit's needle, which may be uſed where a ſtrait needle cannot with ſafety. Fig. 3. repreſents a wound, the lips of which are united by a ſticking plaſter, indented on both ſides. Fig. 4. ſhews a wound, to which two ſticking plaſters are applied. And fig. 5. a wound of the like nature, to which are applied two ſticking plaſters, without being indented. Fig. 6. repreſents a wound made croſs-ways, marked A, A, A, A, and united by two plaſters, laid likewiſe croſs-ways B, B, B, B. Fig. 7. is a wound, A, A, to which a ſticking plaſter is applied, with two openings in the middle, marked B, B. Fig. 8. is a wound, united by the application of two plaſters, with the tapes fixed to each of them; which are drawn together and faſtened by ſlip-knots, *a*, *a*, *a*. Fig. 9. is a like wound, united with plaſters of the ſame kind, only furniſhed with hooks, *a*, *a*, *a*, *a*, *a*, *a*, inſtead of tapes; by which, with the aſſiſtance of threads tied to them, the lips of the wound are drawn together. Fig. 10. is another method of doing the ſame thing, by means of the ſmall eyes *b*, *b*, *b*, *b*, *b*, *b*, inſtead of the hooks, uſed by the antients. Fig. 11. is a tranſverſe wound, A, A, united by the interrupted ſuture, B, B. Fig. 12. ſhews in what manner a croſs-wound is to be ſtitched up, and the lips of it brought together, by drawing the threads, A, B, C, D, tight. Fig. 13. ſhews where the ſtitches are to be made in a triangular wound, ABC. And fig. 14. how a wound, with two angles, is to be ſtitched with the interrupted ſuture; firſt, at the angles A, A; and then, if neceſſary, on each ſide at B, B. Fig. 15. is a crooked needle, with a double thread, to make the quill-ſuture; A being the needle, B the thread, and C the bow-end of the thread. Fig. 16. is a large tranſverſe wound, A A, united by the triple uninterrupted ſuture, B, B, B. Fig. 17. is the ſame kind of wound, D, D, which is united by rolls of ſilk, A A, B B, covered with ſome wax or plaſter, and contained in the bow-ends of the threads, E, E, E, which are tied with ſlip-knots, C, C, C. Fig. 18. is another method of making the quill-ſuture; A A being the wound, B B the upper roll, C C the lower roll, D, D, D, the ſingle knots which confine the upper roll, and E, E, E, the ſlip-knots which ſecure the lower roll. Fig. 19. repreſents Celſus's ſuture for gaſtroraphy; A A being the beginning of the ſtitches, and B B the end, where they are faſtened in a knot: but this Heiſter reckons a bad method. Fig. 20. is the glover's ſuture, uſed for uniting wounds of the inteſtines; A A being the inteſtine, B B the wound, C the beginning of the ſuture, and D the end of the ſuture, where it is faſtened in a knot. See the article GOSTRORAPHY.

For the ſuture in the operation for the hare-lip, ſee the article LIP.

SWABBER, an inferior officer on board ſhips of war, whoſe employment it is to ſee that the decks are kept neat and clean.

SWABIA, a circle of the german empire, bounded by Franconia and the Palatinate of the Rhine on the north, by Bavaria on the eaſt, by Switzerland and Tyrol on the ſouth, and by the river Rhine, which ſeparates it from Alſatia, on the weſt; being one hundred and thirty miles long, and one hundred and ten broad.

SWAFFAM, a market-town of Norfolk, twenty three miles weſt of Norwich.

SWAINMOTE, or SWANIMOTE. See the article SWANIMOTE.

SWALBEA, in botany, a genus of the *didynamia angioſpermia* claſs of plants, the ſtigma of which is ſimple, and the corolla perſonated: add to this, that the cup is quadrifid; the upper ſegment be-

ing very ſmall, and the lower one large, and emarginated.

SWALE, a river of Yorkſhire, which, riſing on the confines of Weſtmorland, runs ſouth-eaſt through Yorkſhire, and falls into the Ouſe.

SWALLEY, a port-town of India, in the province of Cambaya, twelve miles north-weſt of Surat.

SWALLOW, *hirundo*, in ornithology. See the article HIRUNDO.

SWALLOW-FISH, *hirundo*, in ichthyology. See the article HIRUNDO.

SWALLOW-WORT, in botany, the engliſh name of ſeveral ſpecies of aſclepias. See ASCLEPIAS and VINCETOXICUM.

SWALLOW'S TAIL, in fortification, the ſame with queue d'aronde. See QUEUE.

SWALLOW'S TAIL, in carpentry and joinery. See DOVE-TAILING.

SWALLOWING, or DEGLUTITION. See DEGLUTITION.

SWAN, *cygnus*, in ornithology. See the article CYGNUS.

SWANIMOTE, or SWAINMOTE, is a court touching matters of the foreſt, held thrice a year, before the verderers as judges, by the ſteward of the ſwanimote at this court all freeholders within the foreſt owe ſuit and ſervice; alſo the officers thereof are there to appear, in order to preſent offences. See FOREST.

SWANSEY, a port-town of Glamorganſhire, ſituated on the Briſtol-channel, thirty miles weſt of Cardiff.

SWARDY, in agriculture, an appellation given to lands well covered with graſs.

SWARM *of bees*, in what manner hived, ſee the article HIVING.

SWATH, *faſcia*, in ſurgery, a long and broad bandage, for binding up any diſordered limb. See BANDAGE.

SWEARING, an offence puniſhable by ſeveral ſtatutes: thus, ſtat. 6 and 7 Will. III. cap. 11. ordains, that if any perſon ſhall profanely ſwear, if he be a labourer, ſervant, or common ſoldier, ſhall forfeit 1s. to the poor, for the firſt offence, 2s. for the ſecond, &c. and any perſon not a ſervant, &c. forfeits 2s. for the firſt offence, 4s. for the ſecond, 6s. for the third, &c. to be levied by diſtreſs of goods.

SWEAT, *ſudor*, a ſenſible moiſture iſſuing out of the pores of the ſkins of animals. See PERSPIRATION.

Sweat, if it occaſions no bad ſymptoms, is rather to be promoted than checked, even though it may ſeem profuſe in quantity; and in this caſe the proper regimen is a moderate warmth, a quiet ſtate of the body, and frequent draughts of warm liquors: but when the ſtrength is found to be too much exhauſted by theſe ſweats, ſmall doſes of nitre are found of great ſervice.

When different diſorders ariſe from the ſuppreſſion of ſweats, nothing is of greater ſervice than the compound powder of antimonium diaphoreticum, crab's eyes, and nitre, given in ſmall doſes, every three hours; and a quiet poſture of the body is to be ordered, which greatly tends to promote ſweating; and frequent draughts of warm and weak liquors are to be taken; and the bowels are to be relaxed with a clyſter, or gentle purge, if there be no ſymptom neceſſarily forbidding it. In regard to thoſe perſons, who are naturally very difficult to be ſweated, a draught made of freſh arum-root and wine, or vinegar, uſually brings on profuſe ſweating, if they are put to bed, and warm liquors drank afterwards. It is a very good general caution, that profuſe ſweats, if they have continued ever ſo many months, are never to be ſuppreſſed by aſtringents; for in that caſe they are uſually attended with ſymptoms much worſe than the original complaint. The common way of forcing out ſuppreſſed ſweats by the hot alexipharmics and volatile ſalts, is by no means adviſeable in any caſe. Bleeding, judiciouſly timed, is often of very great ſervice in promoting ſweats. When the natural ſweats of children are repelled, they become ſuddenly feveriſh and ill, and nothing relieves them till the ſweats are recalled. This may be done ſimply, by keeping them warmer than before, in moſt caſes; but when that fails, the gentle abſorbents are to be preſcribed; and if they ſuck, the nurſe may take the common alexipharmic medicines: crab's eyes are as proper as any thing for the child, in this caſe; and for the nurſe, the lapis contrayerva. The convulſions of children very often ariſe from the ſuppreſſion of their ſweats, and are always then taken off, by making them ſweat again.

Exceſſive ſweating, in hectical and conſumptive patients, being never ſalutary, ſhould be diminiſhed by light covering, attemperating powder of crab's eyes, with nitre, taken in the evening, to which may be added a grain or two of ſtorax-pills, with a ſufficient quantity of whey, or butter-milk, or an emulſion.

The copious ſweats at the end of intermitting

mitting fevers, as alſo in the criſes of other fevers, are highly beneficial; and, therefore, ought to be promoted, by lying quietly in bed, and taking a ſufficient quantity of a proper fluid, with diaphoretic potions. But ſhould the patient ſweat too much after the cure of a fever, he ought to drink bitters, twice or thrice a day, with a fourth part of the eſſence of eleutheria; and at night to take a doſe of the ſpecies of hyacinth, with a grain or two of borax-pills.

SWEATING-SICKNESS. See the article SUDOR ANGLICANUS.

SWEDEN, one of the moſt northerly kingdoms of Europe, bounded by norwegian Lapland on the north, by Ruſſia on the eaſt, by the Baltic ſea on the ſouth, and by Norway on the weſt; being upwards of eight hundred miles from north to ſouth, and five hundred from eaſt to weſt.

SWEEP, in the ſea-language, is that part of the mould of a ſhip, where ſhe begins to compaſs in at the rung-heads: alſo, when the hawſer is dragged along the bottom of the ſea, to recover any thing that is ſunk, they call this action ſweeping for it.

SWEET, in the wine-trade, denotes any vegetable juice, whether obtained by means of ſugar, raiſins, or other foreign or domeſtic fruit, which is added to wines, with a deſign to improve them. See the article WINE.

It is plain, ſays Dr. Shaw, from the making of artificial muſt, or ſtum, by means of fine ſugar, with a ſmall addition of tartar, that the art of ſweet-making might receive a high degree of improvement, by the uſing pure ſugar, as one general wholeſome ſweet, inſtead of thoſe infinite mixtures of honey, raiſins, ſyrups, treacle, ſtum, cyder, &c. wherewith the ſweet-makers ſupply the wine-coopers, to lengthen out or amend their wines: for pure ſugar being added to any poor wine, will ferment therewith, and improve it, and bring it to a proper degree of ſtrength and vinoſity. If the wine that is to be amended is tart of itſelf, no tartar ſhould be added to the ſugar; but if it be too ſweet or luſcious, then the addition of tartar is neceſſary.

SWEET-ALMONDS. See ALMONDS.

SWEET-SUBLIMATE *of mercury*, the ſame with mercurius dulcis. See the articles MERCURY and CALOMEL.

SWEET-WILLIAMS, in botany, the engliſh name of ſeveral beautiful ſpecies of caryophyllus, or dianthus. See the article DIANTHUS.

SWELLING, in ſurgery. See the articles INFLAMMATION and TUMOUR.

SWERIN, a town of lower Saxony, in Germany, capital of the dutchy of Mecklenburg, and ſituated on the lake of Swerin, in eaſt longit. 11° 30′, and north lat. 54°.

SWERNICK, a town of european Turky; ſituated on the river Drino, on the confines of Servia and Boſnia: eaſt lon. 20°, north lat. 44° 30′.

SWERTIA, in botany, a genus of the *pentandria-digynia* claſs of plants, the corolla whereof conſiſts of a ſingle petal, with a plane limb, divided into five ſub-lanceolated ſegments; the fruit is a cylindric capſule, pointed at each end, with only one cell, in which are included numerous ſmall ſeeds.

SWIFTERS, in a ſhip, are ropes belonging to the fore and main-ſhrouds, for ſecuring thoſe maſts.

SWIFTING *a boat*, is encompaſſing her gun-wale with a ſtrong rope: ſwifting a ſhip, is either bringing her a-ground, or upon a careen: and ſwifting the capſtan-bars, is ſtraining a rope all round the outer ends of them, to prevent their flying out of the drum-head.

SWIMMING, the art or act of ſuſtaining the body in water, and of moving therein; in which action the air-bladder and fins of fiſhes bear a conſiderable part. See AIR-BLADDER and FINS.

Some have ſuppoſed, that the motion of fiſh in the water, depend principally upon the pectoral fins, but the contrary is eaſily proved by experiment; for if the pectoral fins of a fiſh are cut off, and it be again put into the water, it will be found to move forward or ſideways, upward or downward, as well as it did when it had them on. If a fiſh be carefully obſerved, while ſwimming in a baſon of clear water, it will be found not to keep theſe pectoral fins conſtantly expanded, but only to open them at ſuch times as it would ſtop or change its courſe; this ſeeming to be their principal, if not their only, uſe. The pectoral and ventral fins, in the common fiſhes of a compreſſed form, ſerve in the ſame manner in keeping the fiſh ſtill, and ſerve in ſcarce any other motion than that towards the bottom: ſo that that this motion of the fiſh, which has been generally attributed to their fins, is almoſt wholly owing

ing to their muſcles, and to the equipoiſe of their air-bladder. That the uſe of the pectoral and ventral fins is to keep the fiſh ſteady and upright in the water, is evident from the conſequences of their loſs: if they are cut off, and the fiſh put again into the water, it cannot continue in its natural erect poſture, but ſtaggers about, and rolls from ſide to ſide. The fins of the back and anus are alſo of great uſe to the keeping the creature in its natural poſition, as is eaſily ſeen by cutting them off, and obſerving the motions of the fiſh afterwards.

Though a great deal depends on the motion of the muſcles of the ſeveral parts of the body, in the ſwimming of the fiſh, yet the tail, and thoſe muſcles which move the lower part of the body, to which it is affixed, are the great inſtruments by which their ſwift motions in the water are performed. The moving the tail, and that part of the body to which it adheres, backward and forward, or ſideways any one way, throws the whole body of the fiſh ſtrongly the contrary way; and even in ſwimming ſtrait forward, the motion and direction are both greatly aſſiſted by the vibrations of this part, as may be experienced in the motion of a boat, which, when impelled forward, may be firmly guided by means of an oar held out at its ſtern, and moved in the water as occaſion directs. The dorſal muſcles, and thoſe of the lower part of the body between the anus and tail, are the principal that are uſed in the motion of this part, and theſe are therefore the moſt uſeful to the fiſh in ſwimming. The muſcles of the belly ſeem to have their principal uſe in the contracting the belly and the air-bladder. They have been ſuppoſed of uſe to move the belly-fins; but there are too many of them for ſuch a purpoſe, and theſe fins have each its peculiar muſcle fully ſufficient to the buſineſs. The uſe of the tail in ſwimming is eaſily ſeen, by cutting it off, and committing the fiſh to the water without it, in which caſe it is a moſt helpleſs creature.

Let AB (plate CCLXII. fig. 5. n° 1.) be a fiſh ſwimming, by expanding or contracting its air-bladder L, it can riſe or ſink in the water at pleaſure; and its direct motion is performed by means of its tail BCD, vibrating from one ſide to another; which is performed thus; ſuppoſe the tail in the poſition FG (*ibid.* n° 2.) being about to be moved ſucceſſively to H, I, and K; the fiſh firſt turns the end G, oblique to the water, and moves it quickly towards K; the reſiſtance of the water, acting in the mean time obliquely, moves him partly forward and partly ſideways; but this lateral motion is corrected by the next ſtroke, from K towards I, H, and G; which is performed by turning the tail obliquely the contrary way to what it was in the firſt ſtroke. By help of the tail they alſo turn about, by ſtriking ſtrongly with it on one ſide, and keeping it bent, ſo as to act like the rudder of a ſhip. The fins, eſpecially the pectoral ones E, E, ſerve to keep the fiſh upright, as alſo to aſcend and deſcend.

Brutes ſwim naturally, but men attain this art by practice and induſtry: it conſiſts principally in ſtriking alternately with the hands and feet; which, like oars, row a perſon forward: he muſt keep his body a little oblique, that he may the more eaſily erect his head, and keep his mouth above-water.

SWINDON, a market-town of Wiltſhire, twenty-five miles north of Saliſbury.

SWINE, in zoology, a general name for the ſus or hog-kind. See HOG.

Swine are very profitable creatures to the owner, being kept at ſmall expence, feeding on things that would be otherwiſe thrown away, and producing a very large increaſe. They are apt to dig up the ground, and break fences; but this may be prevented, by putting rings in their noſes, and yoaks about their necks.

For the properties of a boar, kept for breeding, ſee the article BOAR.

SWINGLING, the beating of flax, or hemp, after it has been well broken with the brake: this is done by taking up the flax in handfuls, and then beating it with a rod, or flatted and ſmooth ſtick, in order to free it from the bun, and prepare it for being heckled. See the articles FLAX and HEMP.

SWITZ, or SWISSE, the capital of one of the cantons of Switzerland, to which it gives name, ſituated on the eaſt ſide of the lake of Lucern, ſixteen miles ſouth-eaſt of the city of Lucern: eaſt lon. 8° 30′, and north lat. 47°.

SWITZERLAND, or SWISSERLAND, called Helvetia by the Romans, is ſurrounded by the territories of Germany, France, and Italy, being about two hundred and ſixteen miles long, and upwards of one hundred miles broad.

The ſeveral cantons or provinces of Switzerland, which are thirteen in number, have

have been mentioned under their reſpective heads BERN, BASIL, *&c.*

SWOLL, or ZWOLL, a town of the united Netherlands, ſituated in the province of Overyſſel: eaſt lon. 6°, and north lat. 52° 37'.

SWOONING, in medicine, a ſpecies of lipothymy, wherein the patient is deprived of all ſenſe and motion. See the article LIPOTHYMIA.

SWORD, *gladius*, an offenſive weapon worn at the ſide, and ſerving either to cut or ſtab: its parts are the handle, guard, and blade; to which may be added the bow, ſcabbard, pummel, *&c.* Fencing-maſters, however, divide the ſword into the upper, middle, and lower part; or the fort, middle, and foible. See the article FENCING.

SWORD-FISH, *xiphias*. See XIPHIAS.

SWORD-HAND, in horſemanſhip. See the article HAND.

SYCAMORE-TREE, in botany, the engliſh name of the acer major, or greater maple. See the article MAPLE.

SYCOPHANT, *συκοφάντης*, an appellation given by the antient Athenians to thoſe who informed of the exportation of figs, contrary to law; and hence it is ſtill uſed in general for all informers, paraſites, flatterers, cheats, *&c.*

SYLLABIC AUGMENTS, in greek grammar. See AUGMENT.

SYLLABLE, *συλλαβὴ*, in grammar, a part of a word, conſiſting of one or more letters, pronounced together. See the articles WORD and PRONUNCIATION.

According as words contain one, two, three, four, *&c.* ſyllables, they are denominated monoſyllables, biſſyllables, triſſyllables, tetraſyllables, polyſyllables, *&c.* and the diviſion of a word, into its conſtituent ſyllables, is called ſpelling. See the article SPELLING.

SYLLABUB, a compound liquor, made of white wine and ſugar, into which is ſquirted new milk with a ſyringe. If cream be uſed inſtead of milk, it is called whipt ſyllabub.

SYLLABUS, in matters of literature, denotes a table of contents, or an index of the chief heads of a book or diſcourſe.

SYLLEPSIS, in latin and greek grammar, is the agreement of a verb or adjective, not with the word next it, but with the word moſt worthy in the ſentence.

Syllepſis is threefold: 1. Of gender, when the adjective agrees with the maſculine noun, preferable to the feminine; as, *rex & regina beati*. 2. Of perſon, when the verb agrees with the firſt, or ſecond, perſon, preferably to the ſecond, or third; as, *erraſtis, Rulle, vehementer; & tu & collegæ tui*. 3. Of number, when the adjective or verb agrees with a noun plural preferably to one ſingular; as *Phrygii comites & lætus Julus incedunt*.

SYLLOGISM, *συλλογισμὸς*, in logic, an argument or term of reaſoning, conſiſting of three propoſitions; the two firſt of which are called premiſes, and the laſt the concluſion. See REASONING, PROPOSITION, *&c.*

Syllogiſms are nothing but the expreſſions of our reaſonings, reduced to form and method: and hence, as every act of reaſoning implies three ſeveral judgments, ſo every ſyllogiſm muſt include three diſtinct propoſitions. Thus, in the following ſyllogiſm:

Every creature poſſeſſed of reaſon and liberty is accountable for his actions.
Man is a creature poſſeſſed of reaſon and liberty:
Therefore man is accountable for his actions.

We may obſerve that there are three ſeveral propoſitions, expreſſing the three judgments implied in the act of reaſoning: the two firſt propoſitions anſwer the two previous judgments in reaſoning; and are hence called premiſes; as being placed before the other, which is termed the concluſion. We are alſo to remember, that the terms expreſſing the two ideas whoſe relation we enquire after, as here, *man* and *accountableneſs*, are in general called the extremes; and that the intermediate idea, by means of which the agreement or diſagreement of the two extremes is traced, *viz. a creature poſſeſſed of reaſon and liberty*, takes the name of the middle term. Hence, by the premiſſes of a ſyllogiſm, we are always to underſtand the two propoſitions where the middle term is ſeverally compared to the two extremes; for theſe conſtitute the previous judgments, whence the truth we are in queſt of is by reaſoning deduced. The concluſion is that other propoſition, in which the extremes themſelves are joined or ſeparated, agreeably to what appears upon the above compariſon. See PREMISES and CONCLUSION.

As, therefore, the concluſion is made up of the extreme terms of the ſyllogiſm; ſo that extreme, which ſerves as the predicate of the concluſion, goes by the name of the major term; and the other term

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or ſubject of the concluſion, is called the minor term. From this diſtinction of the extremes ariſes alſo a diſtinction between the premiſes; that propoſition, which compares the greater extreme with the middle term, being called the major propoſition; and the other, where the leſſer extreme is compared with the middle term, being called the minor propoſition. See TERM, PREDICATE, *&c.*

In a ſingle act of reaſoning, the premiſes of the ſyllogiſm muſt be ſelf-evident truths, otherwiſe the concluſion could not follow. For inſtance, in the major of the above-mentioned ſyllogiſm, *viz. every creature poſſeſſed of reaſon and liberty is accountable for his actions*, if the connection between the ſubject and predicate could not be perceived by a bare attention to the ideas themſelves, the propoſition would require a proof itſelf; in which caſe, a new middle term muſt be ſought for, and a new ſyllogiſm formed to prove the ſaid major: and ſhould it ſo happen, that in this ſecond eſſay there was ſtill ſome propoſition whoſe truth did not appear at firſt ſight, recourſe muſt be had to a third ſyllogiſm to prove it. And when, by conducting our thoughts in this manner, we at laſt arrive at ſome ſyllogiſm, where the premiſes or previous propoſitions are intuitive or ſelf-evident truths; the mind then reſts in full ſecurity, as perceiving that the ſeveral concluſions it has paſſed thro' ſtand upon the immoveable foundation of ſelf-evidence, and when traced to their ſource terminate in it. The great art lies, in ſo adjuſting our ſyllogiſms to one another, that the propoſitions ſeverally made uſe of as premiſes may be manifeſt conſequences of what goes before, ſo as to form one connected demonſtration. See the article DEMONSTRATION.

With reſpect to the different forms or figures of ſyllogiſms, it frequently happens that the middle term is the ſubject of the major term, and the predicate of the minor: but though this diſpoſition of the middle term be the moſt natural and obvious, it is not, however, neceſſary; ſince the middle term is often the ſubject of both the premiſes, or the predicate in both; and ſometimes it is the predicate in the major and the ſubject in the minor propoſition. Now this variety in the order and diſpoſition of the middle term, conſtitutes what logicians call the forms or figures of ſyllogiſm. See FIGURE.

But beſides this diſtinction of ſyllogiſms into different figures, there is alſo a farther ſubdiviſion of them in every figure, called modes, or moods. See MOOD.

Theſe diſtinctions of ſyllogiſm, according to figure and mood, reſpects chiefly ſimple ſyllogiſms, or thoſe limited to three propoſitions, all ſimple; and where the extremes and middle term are connected immediately together. But as the mind is not tied down to any one form of reaſoning, but ſometimes makes uſe of more, ſometimes of fewer premiſes, and often takes in compound and conditional propoſitions, there hence ariſe other diſtinctions of ſyllogiſms.

When in any ſyllogiſm the major is a conditional propoſition, the ſyllogiſm itſelf is termed conditional. Such is the following one:

If there is a God, he ought to be worſhiped;
But there is a God:
Therefore he ought to be worſhiped.

In ſyllogiſms of this kind, the relation between the antecedent, or the conditional part *if there is a God*, and the conſequent *he ought to be worſhipped*, muſt ever be real and true; that is, the antecedent muſt always contain ſome certain and genuine condition, which neceſſarily implies the conſequent; otherwiſe the propoſition itſelf will be falſe, and therefore ought not to be admitted into our reaſonings. There are two kinds of conditional ſyllogiſms, one of which is called in the ſchools modus ponens; becauſe from the admiſſion of the antecedent they argue to the admiſſion of the conſequent, as in the ſyllogiſm above: the other is called modus tollens, becauſe in it both antecedent and conſequent are rejected, as in the following ſyllogiſm:

If God were not a being of infinite goodneſs, neither would he conſult the happineſs of his creatures;
But God does conſult the happineſs of his creatures:
Therefore he is a being of infinite goodneſs.

Again, as from the major's being a conditional propoſition, we obtain conditional ſyllogiſms; ſo where it is a diſjunctive propoſition, the ſyllogiſm is alſo called diſjunctive, as in the following example.

The world is either ſelf-exiſtent, or the work of ſome finite, or ſome infinite being.

But

But it is not ſelf-exiſtent, nor the work of a finite being:

Therefore it is the work of an infinite being.

Now a disjunctive propoſition is that, where of ſeveral predicates, we affirm one neceſſarily to belong to the ſubject, to the excluſion of all the reſt, but leave that particular one undetermined: hence it follows, that as ſoon as we determine the particular predicate, all the reſt are to be of courſe rejected; or if we reject all the predicates but one, that one neceſſarily takes place. When, therefore, in a disjunctive ſyllogiſm, the ſeveral predicates are enumerated in the major; if the minor eſtabliſhes any one of theſe predicates, the concluſion ought to remove all the reſt; or if in the minor, all the predicates but one are removed, the concluſion muſt neceſſarily eſtabliſh that one.

In the ſeveral kinds of ſyllogiſms hitherto mentioned, we may obſerve, that the parts are complete; that is, the three propoſitions of which they conſiſt, are expreſſed in form. But it often happens, that ſome one of theſe premiſes is not only an evident truth, but alſo familiar and in the mouths of all men; in which caſe it is uſually omitted, whereby we have an imperfect ſyllogiſm, that ſeems to be made up of only two propoſitions: ſuch is the following one:

Every man is mortal;

Therefore every king is mortal.

Here the minor propoſition, *every king is man*, is omitted, as being ſo clear and evident, that the reader may eaſily ſupply it.

SYMBOL, *συμβολον*, a ſign or repreſentation of ſomething moral, by the figures or properties of natural things.

Hence ſymbols are of various kinds, as hieroglyphics, types, ænigmas, parables, fables, *&c.* See HIEROGLYPHICS, *&c.*

Among chriſtians, the term ſymbol denotes the apoſtles creed. See CREED.

SYMMETRY, *συμμετρια*, the juſt proportion of the ſeveral parts of any thing, ſo as to compoſe a beautiful whole.

SYMPATHETIC, ſomething that acts, or is acted on, by ſympathy: thus we ſay, ſympathetic diſeaſes, inks, powders, *&c.* See DISEASE, *&c.*

SYMPATHETIC INK. See the article *Sympathetic* INK.

SYMPATHETIC POWDER. The compoſition of the famous ſympathetic powder, uſed at Goſſelaer by the miners in all their wounds, is this. Take of green vitriol, eight ounces; of gum tragacanth, reduced to an impalpable powder, one ounce; mix theſe together, and let a ſmall quantity of the powder be ſprinkled on the wound, and it immediately ſtops the bleeding. The vitriol is to be calcined to whiteneſs in the ſun, before it is mixed with the gum.

SYMPATHY, *συμπαθεια*, an agreement of affections and inclinations, or a conformity of natural qualities, humours, temperaments, *&c.* which make two perſons delighted and pleaſed with each other.

In medicine, ſympathy denotes an indiſpoſition befalling one part of the body, through the defect or diſorder of another; whether it be from the affluence of ſome humour, or vapour ſent from elſewhere; or from the want of the influence of ſome matter neceſſary to its action. See CONSENT *of parts*.

SYMPHONY, *συμφωνια*, in muſic, properly denotes a conſonance or concert of ſeveral ſounds agreeable to the ear, whether vocal or inſtrumental, called alſo harmony. See the articles HARMONY and CONCERT.

SYMPHYSIS, in anatomy, one of the kinds of junctures, or articulation, of the bones. See ARTICULATION.

Symphyſis is twofold. 1. Without a medium, or any thing between the two bones; which coaleſce or touch each other: ſuch is the articulation in the os frontis, the upper maxilla, the oſſa innominata, *&c.* 2. By the intervention of a medium, or ſubſtance different from the bones themſelves; as in the vertebræ, the ſutures of the ſkull, the ſcapula and gums. See VERTEBRÆ, SKULL, *&c.*

SYMPHYTUM, COMFREY, in botany, a genus of the *pentandria-monogynia* claſs of plants, with a monopetalous flower, quinquedentated at the limb: there is no pericarpium; the ſeeds, which are four in number and gibbous, being contained in the cup.

Comfrey-root agrees in medicinal virtues with thoſe of althæa. See the article ALTHÆA.

SYMPLEXIUM, in natural hiſtory, the name of a genus of foſſils, of the claſs of the ſelenitæ, but not of the determinate and regular figure of moſt of the genera of thoſe bodies, but compoſed of various irregular connections of differently ſhaped, and uſually imperfect bodies. See the article SELENITÆ.

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SYMPOSIARCH, *συμποσιαρχος*, in antiquity, the director, or manager of an entertainment. This office was ſometimes performed by the perſon at whoſe charge the entertainment was provided; ſometimes by another named by him; and at other times, eſpecially in entertainments provided at the common expence, he was elected by lot, or by the ſuffrages of the gueſts. He was otherwiſe called *baſileus*, *rex*, and *modimperator*, &c. and determined the laws of good fellowſhip, obſerved whether every man drank his proportion, whence he was called *ophthalmus*, *oculus*, the *eye*.

SYMPTOM, *συμπτωμα*, in medicine, any appearance in a diſeaſe, which ſerves to indicate or point out its cauſe, approach, duration, event, &c. See DISEASE, INDICATION, &c.

In a ſtrict ſenſe, however, ſymptom means no more than the conſequences of diſeaſes, and of their cauſes, excluſive of the diſeaſes and cauſes themſelves; and ſo is no other than a preternatural affection, which follows the diſeaſe, as the ſhadow follows the body.

SYMPTOMATICAL, in medicine, is a term often uſed to denote the difference between the primary and ſecondary cauſes in diſeaſes: thus a fever from pain is ſaid to be ſymptomatical, becauſe it riſes from pain only; and therefore the ordinary means in fevers are not in ſuch caſes to be had recourſe to, but to what will remove the pain; for, when that ceaſes, the fever will ceaſe without any direct means taken for it.

SYNÆRESIS, *συναιρεσις*, contraction in grammar, a figure whereby two ſyllables are united in one: as *vemens* for *vehemens*.

SYNAGOGUE, *ſynagoga*, a particular aſſembly of Jews met to perform the offices of their religion. Alſo the place wherein they meet.

SYNALOEPHA, *συναλοιφη*, in grammar, a contraction of ſyllables, performed principally by ſuppreſſing ſome vowel or diphthong at the end of a word, on account of another vowel or diphthong at the beginning of the next. As *ill' ego*, for *ille ego*, &c.

SYNARTHROSIS, in anatomy, a ſpecies of articulation, wherein there is only an obſcure motion, as in the bones of the carpus and metacarpus, the tarſus and metatarſus, &c. or there is no motion at all, as in the ſutures of the ſkull, and articulations per harmoniam or bare application. See CARPUS, &c.

SYNCHONDROSIS, in anatomy, a ſpecies of ſymphyſis; being the union of two bones by means of a cartilage, as in the vertebræ.

SYNCHRONISM, *συγχρονισμος*, denotes the happening of ſeveral things in the ſame time: for if in equal times, it is more properly called iſochroniſm. See the article ISOCHRONAL.

SYNCOPATION, in muſic, denotes a ſtriking or beating of time, whereby the diſtinction of the ſeveral times or parts of the meaſure is interrupted.

However, it is more properly uſed for the connecting the laſt note of any meaſure, or bar, with the firſt of the following meaſure; ſo as only to make one note of both.

A ſyncope is ſometimes alſo made in the middle of a meaſure.

Syncopation is alſo uſed when a note of one part ends or terminates on the middle of a note of the other part. This is otherwiſe denominated binding.

It is likewiſe uſed for a driving note; that is, when ſome ſhorter note at the beginning of a meaſure, or half meaſure, is followed by two, three, or more longer notes before another ſhort note occurs, equal to that which occaſioned the driving, to make the number even, *e. gr.* when an odd crotchet comes before two or three minims, or an odd quaver before two, three, or more crotchets.

In ſyncopated or driving notes, the hand or foot is taken up, or put down, while the note is ſounding.

SYNCOPE, FAINTING, in medicine, a deep and ſudden ſwooning, wherein the patient continues without any ſenſible heat, motion, ſenſe, or reſpiration, and is ſeized with a cold ſweat over the whole body, and all the parts turn pale and cold as if dead. See LIPOTHYMIA.

SYNCOPE, in grammar, an eliſion or retrenchment of a letter or ſyllable out of the middle of a word, as *caldus* for *calidus*, *aſpris* for *aſperis*, &c.

SYNDESMUS, in anatomy, a word uſed for a ligament. See LIGAMENT.

In grammar, ſyndeſmus is uſed for a conjunction.

SYNDIC, in government and commerce, an officer in divers countries intruſted with the affairs of a city, or other community, who calls meetings, makes repreſentations and ſolicitations to the miniſtry,

miniſtry, magiſtracy, &c. according to the exigency of the caſe. The ſyndic is appointed to anſwer and account for the conduct of the body, he makes and receives propoſals for the advantage thereof, controuls and corrects the failings of particular perſons of the body, or at leaſt procures their correction at a public meeting. In effect, the ſyndic is at the ſame time both the agent and cenſor of the community. Almoſt all the companies in Paris, as the univerſity, companies of arts and trades, have their ſyndics, and ſo have moſt of the cities of Provence and Languedoc.

Syndic is alſo uſed for a perſon appointed to ſollicit ſome common affair wherein he himſelf has a ſhare, as happens particularly among the ſeveral creditors of the ſame debtor who fails or dies inſolvent. The chief magiſtrate of Geneva is alſo called ſyndic. There are alſo four ſyndics choſen every year, the eldeſt of whom preſides in the council of twenty-five, which is the chief council of the city, wherein all affairs are diſpatched, both civil and political; thus the three other elect cannot all come at the office till the four years end, ſo that the ſyndicate rolls among ſixteen perſons all choſen out of the council of twenty-five.

SYNDROME, a word introduced into medicine by the empirics, who mean by it a concourſe of ſymptoms: thus under a plethora an empiric judges veneſection neceſſary from a ſyndrome of ſymptoms, ſuch as diſtention of the veſſels, a redneſs and gravity of the whole body, an indiſpoſition to motion, tenſions of the limbs, and a ſenſe of an ulcerous laſſitude, beſides a life ſpent in idleneſs, high and full feeding, and a ſuppreſſion of wonted excretions. This is the plethoric ſyndrome of an empiric, and after the ſame manner he forms a ſyndrome or concourſe of ſymptoms in a peripneumony, quinſey, epilepſy, and other diſeaſes. Galen ridicules theſe ſyndromes, becauſe, he ſays, they happen very rarely, and alſo very ſlowly; ſo that ſhould a phyſician wait for a ſyndrome of all the ſymptoms he expects, he might adminiſter his remedies too late.

SYNECDOCHE, in rhetoric, a kind of figure or rather trope, frequent among orators and poets. There are three kinds of ſynecdoches; by the firſt, a part is taken for the whole, as the point for the ſword, the roof for the houſe, the ſails for the ſhip, &c. By the ſecond, the whole is uſed for a part. By the third, the matter whereof the thing is made is uſed for the thing itſelf; as ſteel for ſword, ſilver for money, &c. To which may be added another kind, when the ſpecies is uſed for the genus, or the genus for the ſpecies.

SYNECDOCHE, in greek and latin grammar, is when the ablative of a part or an adjunct of a ſentence is changed into the accuſative, the greek propoſition κατα, or the latin *ſecundum*, or *quod ad*, being underſtood. Examples of the ablative of the part being changed into the accuſative, are the following from Virgil. *Expleri mentem nequit*, for *quod ad mentem*; and *Deiphobum videt lacerum crudeliter ora*, for *quod ad ora*; and an example of the ablative of the adjunct being changed into the accuſative from the ſame author, is as follows. *Flores inſcripti nomina regum*, for *quod ad nomina regum*.

SYNECPHONESIS, or SYMPHONESIS, in grammar, a coalition whereby two ſyllables are pronounced as one, being much the ſame as the ſynalœpha, or ſynæreſis. See SYNALOEPHA and SYNÆRESIS.

SYNEDRIN, or SYNEDRION. See the article SANHEDRIN.

SYNGENESIA, συγγενεσια, in botany, one of Linnæus's claſſes of plants, the nineteenth in order; ſo called becauſe the ſtamina in theſe plants grow together, or are formed into a ſingle regular congeries.

The general characters of this claſs are theſe: the cup is the crown of the ſeeds, and ſtands on the ſummit of the germen; and the compound flowers are very various, in regard to the nature of the floſcules. 1. Some are compoſed of tubuloſe hermaphrodite flowers in the diſk, and of the ſame ſort of tubulous hermaphrodite flowers in the radius. 2. Others are compoſed of tubuloſe hermaphrodite flowers in the diſk, and of tubulous female flowers in the radius. 3. Some are compoſed of tubulous hermaphrodite flowers in the diſk, and of tubuloſe neutral flowers in the radius. 4. Some have tubuloſe hermaphrodite flowers in the diſk, and ligulated hermaphrodite flowers in the radius. 5. Some are compoſed of tubulous hermaphrodite flowers in the diſk, and of ligulated female flowers in the radius. 6. Some are compoſed of tubulous hermaphrodite flowers in the diſk, and ligulated neutral flowers in the radius. 7. Some are compoſed of tubulous hermaphrodite flowers in the

diſk, and of naked and neutral flowers in the radius. 8. Some are compoſed of tubuloſe male flowers in the diſk, and of naked female flowers in the radius. And, 9. Some are compoſed of ligulated female flowers in the diſk, and ligulated hermaphrodite flowers in the radius.

The ſtamina are five very ſhort and ſlender filaments, inſerted into the tube of the flower. The antheræ are of the ſame number with the ſtamina: they are ſlender, erect, and grow together at their ſides, ſo as to form a tubular cylindric body of the length of the mouth of the flower, and divided into five ſegments at the edge. The germen of the piſtil is oblong, and placed under the receptacle of the flower. The ſtyle is capillary, erect, and of the length of the ſtamina, and goes through the cylinder formed by the antheræ. The ſtigma is divided into two parts, which ſtand open, and bend backwards.

Theſe plants have properly no pericarpium, though in ſome few ſpecies there is a coriaceous cruſt placed about the ſeed. The ſeed is ſingle and oblong, often of a quadrangular figure, and ſometimes narrower at the baſe than in any other part. However, in different genera of this claſs, they are of a very different appearance at the ends. Some are crowned with a downy matter, compoſed of a great number of ſingle ſhort filaments, placed circularly, or otherwiſe, on the head of the ſeed. In ſome the downy matter is radiated; in others it is ramoſe, or branched; and in ſome it is ſupported on a pedicle, while in others it ſtands immediately on the ſeed. In ſome genera the ſeeds have no down at all, but have a ſmall corona, formed of what was originally the cup of the flower. This is permanent, and divided uſually into five ſegments. In ſome genera the ſeed is wholly naked, having neither any down nor this crown of a cup.

SYNGNATHUS, in ichthyology, a genus of the malacopterigious claſs of fiſhes, the body of which is long and very ſlender; ſometimes it is rounded, but in moſt of the ſpecies it is angulated; the fins are in ſome ſpecies four, but in others there is only one; the head is of an oblong figure, and compreſſed; the jaws are cloſed together at the ſides, and the mouth has only a ſmall opening, which is quite at the extremity; the coverings of the gills are compoſed each of only one ſimple and very thin bony lamina.

This genus comprehends the ſea-adder, or the rounded bodied ſyngnathus, with no pectoral nor tail-fins; the ſyngnathus with the middle of the body heptangular, and a fin at the tail; the needle-fiſh, being the ſyngnathus with the middle of the body hexangular, and the tail pinnated; and the ſea-horſe, or hippocampus. See HIPPOCAMPUS.

SYNNEUROSIS, in anatomy, a kind of articulation of the bones, performed by the intervention of ligaments. See the article ARTICULATION.

The ſynneuroſis is reckoned a branch of the ſymphyſis, and is, when the bones are connected together by a ligament, as in the os femoris to the os iſchium, and the patella to the tibia. See the article SYMPHYSIS.

SYNOCHUS, or SYNOCHA, in medicine, a continual fever, without any remiſſion. See the article FEVER.

This ſpecies of fever, according to Hoffman, is the firſt in the claſs of inflammatory fevers. It begins without any remarkable cold or ſhivering, and is very violent at the firſt onſet, and continues with little or no remiſſion of the ſymptoms, till the time of the criſis; the pulſe is great and full. See the articles INFLAMMATION and INFLAMMATORY. The diſeaſe generally infeſts one part more than another; if the head, the face will ſwell, the eyes look red and full of tears, the head will ach with an unuſual pulſation of the temporal arteries, there will be a vertigo, a drowſineſs, an inſenſibility, and a raving; if the heart and lungs, a thick difficult reſpiration, anxiety, and palpitation of the heart, with loſs of ſtrength, and a dejection of mind; if the oeſophagus, thirſt, a dryneſs, and blackneſs of the tongue; if the ſtomach, a nauſea, and reaching to vomit, and ſometimes hiccoughing; if the bowels, inflations, coſtiveneſs, or fetid ſtools; if in the veſſels of the meſaraic viens and arteries, a fixed pain about the vertebræ of the loins; if in the membranes of the ſpinal marrow, a tumbling and toſſing, a numbneſs and weakneſs of the joints, and now and then convulſions. It is ſometimes putrid, or malignant, with ſudden loſs of ſtrength, and is not ſeldom attended with duſky or black ſpots, which threaten immediate danger. This fever often terminates ſpontaneouſly on the fourth, ſeventh or eleventh days, generally by a profuſe ſweat, or by a plentiful bleeding at the

the nose; in the malignant kind, by a looseness.

When it is treated rightly, at the beginning, with bleeding, and with cooling and gentle diaphoretic medicines, it often ceases on the fourth day; otherwise, according to Hoffman, it may continue till the fourteenth or seventeenth. Those to whom it turns fatal, generally die of the mortification of some noble part. Bleeding in this disease is highly necessary, and that not sparingly, if the patient's strength will bear it; then a cooling beverage, as the following: Take of spring-water, two pound; of rose-water, and white-sugar, each an ounce; citron-juice, one ounce; or instead thereof, spirit of vitriol, twenty drops: of this mixture, let the patient take frequent draughts. The hartshorn jelly, with sugar, citron-juice, and rose-water, are excellent in this case; as also, whey turned with citron-juice: absorbent diaphoretic powders, are likewise useful, and the body should be kept open with emollient clysters.

SYNOD, in astronomy, a conjunction, or concourse of two or more stars, or planets, in the same optical place of the heavens.

SYNOD, signifies also a meeting, or assembly of ecclesiastical persons, concerning matters of religion; of these, there are four kinds, *viz.* 1. A general or universal synod, where bishops meet from all nations. 2. A national synod, where those of one nation only meet. 3. A provincial synod, where the clergy of one province assemble together. 4. A diocesan synod, where those only of one diocese assemble. See CONVOCATION.

SYNODALS, or SYNODIES, were pecuniary rents, commonly of two shillings paid to the bishop, or archdeacon, at the time of their Easter visitation, by every parish priest. They were thus called, because usually paid in synods, for that anciently bishops used to visit and hold their diocesan synods at once; for the same reason, they are sometimes denominated synodalica, but more properly procurations.

SYNODALES TESTES, was an appellation anciently given to the urban and rural deans, from their informing against, and attesting, the disorders of the clergy, and the people in the episcopal synods. When these sunk in their authority, in their stead arose another sort of synodal witnesses, who were a kind of impanelled jury, consisting of a priest, and two or three laymen for every parish; though at length two for every diocese were annually chosen, till at last the office came to be devolved on the church-wardens. See CHURCH-WARDENS.

SYNODALE INSTRUMENTUM, a solemn oath, or engagement that these synodal witnesses took, as our church-wardens now are sworn to make just presentments. See the preceding article.

SYNODICAL, something belonging to a synod; thus synodical epistles are circular letters written by the synods to the absent prelates and churches, or even those general ones directed to all the faithful, to inform them of what had passed in the synod. For the synodical month, see the article MONTH.

SYNOECIA, in grecian antiquity, a feast celebrated at Athens, in memory of Theseus's having united all the petty communities of Attica into one single common-wealth, the seat whereof was Athens, where all the assemblies were to be held. This feast was dedicated to Minerva, and according to the scholiast of Thucydides, it was held in the month Metagitnion.

SYNONYMOUS, is applied to a word or term that has the same import or signification with another.

SYNONYMISTS, among botanical writers, such as have employed their care in the collecting the different names or synonyma, used by different authors, and reducing them to one another.

SYNONYMY, in rhetoric, a figure whereby synonyms, or synonymous terms, that is, various words of the same signification, are made use of to amplify the discourse.

SYNOVIA, or SYNONIA, in medicine, a term used by Paracelsus, and his school, for the nutricious juice, proper and peculiar to each part; thus they talk of the synovia of the joints, of the brain, *&c.* The mucilaginous glands of the capsulæ ligamentæ, and the sheaths of the tendons, excrete a mucilaginous liquor called synovia, the use of which is to keep the cartilages supple, and consequently to facilitate the motion of the tendons and joints.

Others use synovia for the gout, and other diseases in the joints, arising from a vice in the nutricious juice. Others restrain the term to the oozing out of the juice through a wounded part, especially at a joint.

SYNTAGMA, *συνταγμα*, the diſpoſing or placing of things in an orderly manner.

SYNTAX, *συνταξις*, in grammar, the proper conſtruction, or due diſpoſition of the words of a language, into ſentences, or phraſes; or, as Buffier more accurately defines it, the manner of conſtructing one word with another, with regard to the different terminations thereof, preſcribed by the rules of grammar. See CONSTRUCTION and SENTENCE.

Hence the office of ſyntax is to conſider the natural ſuitableneſs of words with reſpect to one another, in order to make them agree in gender, number, perſon, mood, *&c.* To offend in any of theſe points, is called, to offend againſt ſyntax; and ſuch kind of offence, when groſs, is called a ſoleciſm, and when more ſlight, a barbariſm. See GENDER, *&c.*

Syntax is generally divided into two parts, *viz.* concord, wherein the words are to agree in gender, number, caſe and perſon; and regimen or government, wherein one word governs another, and occaſions ſome variations therein. See CONCORD and REGIMEN.

SYNTEXIS, in medicine, an attenuation, or colliquation of the ſolids of the body, ſuch as frequently happens in atrophies, inflammations of the bowels, colliquative fevers, wherein a fatty and uligenous matter is voided with the excrements by ſtool. See COLLIQUATION, *&c.*

SYNTHESIS, the putting of ſeveral things together, as making a compound medicine of ſeveral ſimple ingredients, *&c.* See the article COMPOSITION.

SYNTHESIS, in logic, denotes a branch of method oppoſite to analyſis, called the ſynthetic method. See METHOD.

SYNTHESIS in grammar. See SYLLEPSIS.

SYNTHESIS in ſurgery, is an operation whereby divided parts are re-united, as in wounds, fractures, luxations, *&c.* See the article WOUND, *&c.*

SYNTHETIC, ſomething relating to ſyntheſis. See the preceding article.

SYNTHETIC, or SYNTHETICAL, is, according to Dr. Shaw, a term given to that part of chemiſtry, which, after the analytical chemiſtry has taken bodies to pieces, or reduced them to their principles, can, from theſe ſeparated principles, either recompound the ſame body again, or, from the mixtures of the principles of one or more bodies in various manners, form a large ſet of new productions, which would have been unknown to the world but for this art: ſuch productions are brandy, ſoap, glaſs, and the like. Synthetical chemiſtry, taken in the ſtrict ſenſe for the recompoſition of bodies from their own principles, is rather of philoſophical than of ordinary uſe. This, however, is not eaſy, except in a few caſes, nor are we to imagine, becauſe it has been done in ſome, that nature has taken this way to compoſe them; her method of compoſition of bodies are a new ſubject, and worthy a diligent inquiry.

SYNUSIASTS, a ſect of heretics, who maintained, that there was but one nature, and one ſingle ſubſtance in Jeſus Chriſt. The ſynuſiaſts denied, that the word aſſumed a body in the womb of the virgin, but held, that a part of the divine word being detached from the reſt, was there changed into fleſh and blood. Thus they taught, that Jeſus Chriſt was conſubſtantial to the father, not only as to his divinity, but even as to his humanity and very body.

SYPHON, or SIPHON. See SIPHON.

SYRACUSE, a city and port-town of Sicily, in the province of Val de Noto, ſituated on a fine bay of the Mediterranean Sea, on the eaſt coaſt of the iſland, in eaſt long. 15° 5′, north lat. 37° 25′.

SYREN, or SIREN, in antiquity. See the article SIREN.

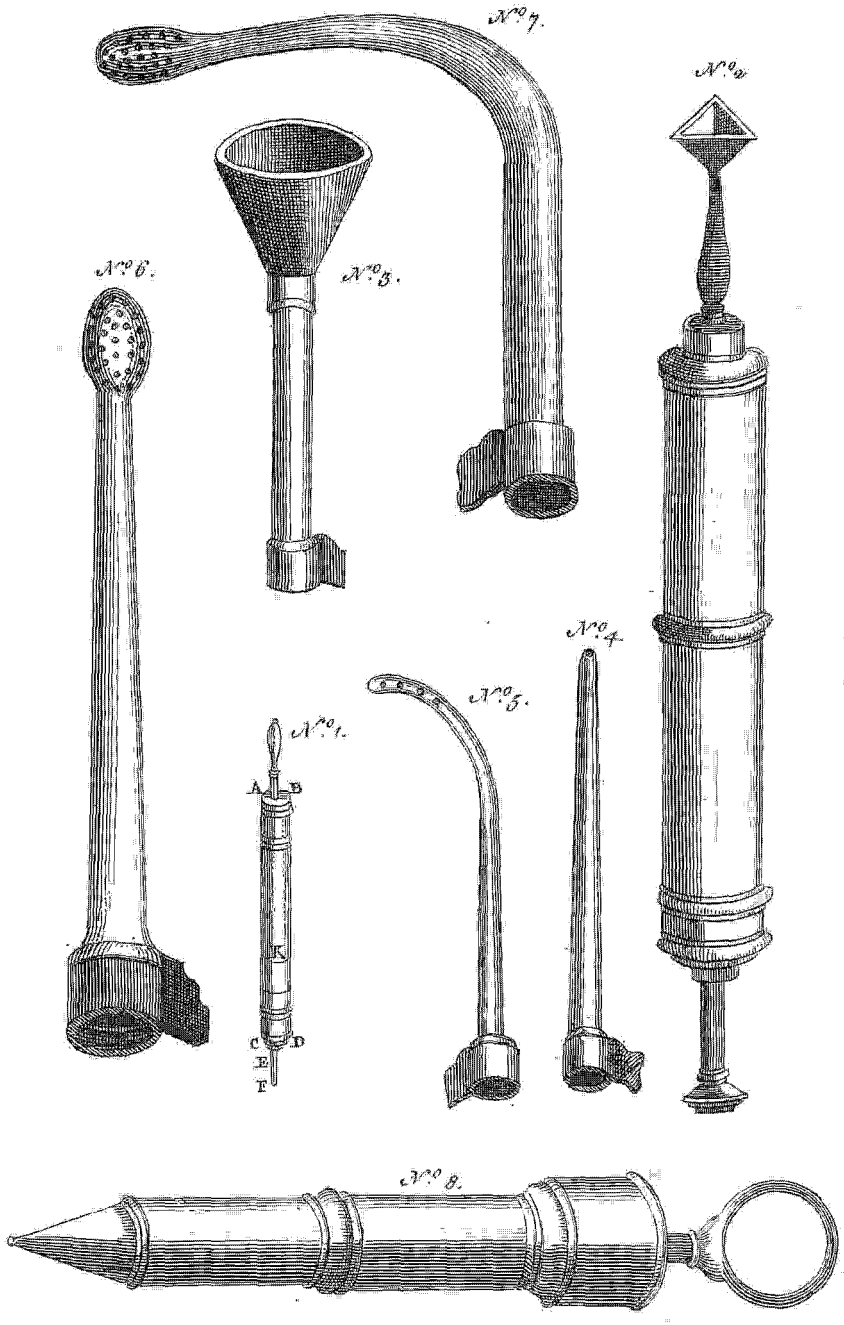
SYRIA, a part of aſiatic Turky, bounded by Natolia and Turcomania, on the north; by Diarbec or Meſopotamia on the eaſt; by Arabia and Paleſtine on the ſouth; and by the Levant-Sea on the weſt. The Turks divide Syria into three beglerbeglies, or vice-royalties, *viz.* Thoſe of Aleppo, Tripoli, and Damaſcus, or Scham, the ſeats of the reſpective viceroys.

SYRIAN YEAR, *&c.* See YEAR, *&c.*

SYRINGA, the PIPE-TREE, in botany, a genus of the *diandria-monogynia* claſs of plants, the corolla whereof conſiſts of a ſingle petal, the tube is cylindric, and very long, the limb is divided into four ſegments of a linear figure, hollow and obtuſely pointed; the fruit is an oblong compreſſed acuminated capſule, formed of two valves, and containing two cells. The ſeeds are ſingle, oblong, and compreſſed, pointed at each end, and furniſhed with a membranaceous margin. This genus comprehends the lilac of Tournefort.

The branches of this tree, when the pith is taken out, ſerve for pipes in ſyringes.

SYRINGES.



J. Jefferys sculp.

SYRINGA, is alſo a name for the plant, otherwiſe called philadelphus. See the article PHILADELPHUS.

SYRINGE, an inſtrument ſerving to imbibe, or ſuck in a quantity of any fluid, and to ſquirt or expel the ſame with violence.

The ſyringe is made of an hollow cylinder A B C D, plate CCLXVI. n° 1. furniſhed with a little tube at the bottom, E F. In this cylinder is an embolus K, made, or at leaſt covered with leather, or ſome other matter, that eaſily imbibes moiſture, and ſo filling the cavity of the cylinder, as that no air or water may paſs between the one and the other. If then the little end of the tube F, be put into water, and the embolus drawn up, the water will aſcend into the cavity left by the embolus, and upon thruſting back the embolus, it will be violently expelled again through the tube E F; and ſtill the greater impetus will the water be expelled withal, and to the greater diſtance, as the embolus is thruſt down with the greater force, or the greater volocity. See the article EMBOLUS.

This aſcent of the water, the antients, who ſuppoſed a plenum, attributed to nature's abhorrence of a vacuum; but the moderns, from repeated experiments, have found it to be owing to the preſſure of the atmoſphere upon the fluid; for by drawing up the embolus, the air left in the cavity of the cylinder, will be exceedingly rarified, ſo that being no longer a counterbalance to the air, incumbent on the ſurface of the fluid, that prevails and forces the water through the little tube into the body of the ſyringe. See the article AIR, &c.

In effect, a ſyringe is only a ſingle pump, and the water aſcends in it on the ſame principle as in the common ſucking pump, whence it follows, that the water will not be raiſed in a ſyringe to any height exceeding thirty-one feet. See the articles PUMP and SUCTION.

Syringes are of conſiderable uſes in ſurgery; by them clyſters are adminiſtered, injections of medicinal waters, &c. made into wounds, &c. They alſo ſerve to inject coloured liquors, melted wax, &c. into the veſſels of the parts of animals, to ſhew the diſpoſition, texture, ramifications, &c. thereof. The moſt conſiderable ſyringes uſed in ſurgery, are theſe following, as repreſented, in pl. *ibid.* where n° 2. is a ſyringe for various uſes, furniſhed with pipes of different ſorts. By the help of this you may not only inject fluids into wounds of the abdomen and thorax, into the fauces, into abſceſſes, ulcers, and to the uterus, but you may alſo, by the aſſiſtance of this inſtrument, draw extravaſed blood from the cavity of the thorax, in which caſe the ſyringe ſhould be twice as large as the mouth: the pipe ſhould be triangular, and about two thumbs breadth: n° 3. is another pipe, with a round mouth, intended for the ſame uſes: n° 4. a ſmaller pipe, which, as well as the reſt, may be ſcrewed on the ſyringe: n° 5. another pipe ſomewhat curved, and perforated on both ſides. This will ſerve to ſuck blood out of the cavity of the thorax, and throw injections into that part, or into the fauces: n° 6. another perforated at the end like a cullender: n° 7. another perforated like the former, but curved, to throw injections into the uterus, and for other uſes: n° 8. repreſents the ſyringe proper for injecting liquors into the urethra of males, and the vagina of females, for various uſes: it ends with an obtuſe point, to prevent the liquor from regurgitating, or flying about.

SYRINGOTOMY, in ſurgery, the operation of cutting for the fiſtula. See the article FISTULA.

SYRINGOTON, the name of an inſtrument to lay open the fiſtula.

SYRUP, or SYROP, in pharmacy, a ſaturated ſolution of ſugar, made in vegetable decoctions, or infuſions. See the article DECOCTION.

Theſe preparations were formerly conſidered as medicines of much greater importance than they are thought to be at preſent. Syrups and diſtilled waters were for ſome ages made uſe of as the great alteratives, inſomuch, that the evacuation of any peccant humour was never attempted, till, by a due courſe of theſe, it had firſt been regularly prepared for expulſion. Hence aroſe the exuberant collection of both, which we meet with in pharmacopœias; and like errors, have prevailed in each. As multitudes of diſtilled waters have been compounded from materials, unfit to give any virtue over the helm, ſo numbers of syrups have been prepared from ingredients which in their form cannot be taken in ſufficient doſes, to exert their virtues; for two-thirds of a ſyrup conſiſt of ſugar, and the greateſt part of the remaining third is an aqueous fluid.

Syrups are at preſent regarded chiefly as convenient vehicles for medicines of greater

greater efficacy, and made uſe of for ſweetening draughts and juleps, for reducing the lighter powders into boluſſes, pills, or electuaries, and other like purpoſes; ſome likewiſe may not improperly be conſidered as medicines themſelves, as thoſe of ſaffron, or buckthornberries.

General rules for preparing SYRUPS. 1. All the rules for making decoctions, are likewiſe to be obſerved in making ſyrups; vegetables both for decoctions and infuſions ought to be dry, unleſs they are expreſsly ordered otherwiſe. 2. In the London Pharmacopœia, only the pureſt, or double refined ſugar, is allowed. In the Edinburgh, the leſs pure, or common white ſugar is employed, and farther purified by the operator. For ſuch ſyrups as are prepared without coction, the ſugar is previouſly diſſolved in water by itſelf, the ſolution clarified with whites of eggs, and boiled down to a thick conſiſtence, the ſcum which ariſes during the boiling being carefully taken off. In the ſyrups prepared by coction, the clarification with whites of eggs is performed after the ſugar has been diſſolved in the decoction of the vegetable, except in the ſyrup of meconium, for which therefore, the pureſt ſugar is directed. The purification of ſugar, by clarification, and deſpumation, is not ſo perfect as might be expected, for after it has undergone this proceſs, the refiners ſtill ſeparate from it a quantity of oily matter, which is diſagreeable to weak ſtomachs. See the articles CLARIFICATION and DESPUMATION.

The clarification of the ſugar along with the vegetable decoction, is likewiſe injurious to the medicine, ſince by this means not only the impurities of the ſugar are diſcharged, but a conſiderable part of what the liquor had before taken up from the other ingredients. It appears therefore moſt eligible to employ fine ſugar for all the ſyrups, even the purgative ones (which have been uſually made with coarſe ſugar, as ſomewhat coinciding with their intention) not excepted; for as purgative medicines are in general ungrateful to the ſtomach, it is certainly improper to employ an addition, which increaſes their offenſiveneſs. 3. Where the weight of the ſugar is not expreſſed, twenty-nine ounces thereof is to be taken to every pint of liquor. The ſugar is to be reduced into powder, and diſſolved in the liquor by the heat of a water-bath, unleſs ordered otherwiſe; although in the formulæ of the ſeveral ſyrups, a double weight of the ſugar to that of the liquor is directed, yet leſs will generally be ſufficient. Firſt, therefore diſſolve in the liquor an equal weight of ſugar, then gradually add ſome more in powder till a little remains undiſſolved at the bottom, which is to be afterwards incorporated by ſetting the ſyrup in a water-bath. The quantity of ſugar ſhould be as much as the liquor is capable of keeping diſſolved in the cold; if there is more, a part of it will ſeparate and concrete into cryſtals, or candy; if leſs, the ſyrup will be ſubject to ferment, eſpecially in warm weather, and change to a vinous or ſour liquor. 4. Copper veſſels, unleſs they are well tinned, ſhould not be employed in the making of acid ſyrups, or ſuch as are compoſed of the juices of fruits. The confectioners, who are the moſt dextrous people at theſe kinds of preparations, to avoid the expence of frequently new tinning their veſſels, rarely make uſe of any other than copper ones untinned in the preparation even of the moſt acid ſyrups, ſuch as that of oranges, lemons, and the like. Nevertheleſs, by taking due care that their coppers be well ſcoured and perfectly clean, and that the ſyrup remain no longer in them than is abſolutely neceſſary, they avoid giving it any ill taſte or quality from the metal. 5. The ſyrup, when made, is to be ſet by till next day: if any ſaccharine cruſt appears upon the ſurface, take it off.

SYSSARCOSIS, in anatomy, a particular ſpecies of the kind of articulation, called alſo ſymphyſis. See the articles ARTICULATION and SYMPHYSIS.

The ſyſſarcoſis is a natural union of two bones by means of fleſh or muſcles, ſuch is that of the os hyoides and omoplate.

Syſſarcoſis is alſo uſed by ſome chirurgical writers to expreſs a method of curing wounds of the head when the cranium is laid bare, and the interſtice between the lips of the wound too wide for a contraction, by means of promoting the granulation or growth of new fleſh.

SYSTEM, *ſyſtema*, in general, denotes an aſſemblage or chain of principles and concluſions, or the whole of any doctrine, the ſeveral parts whereof are bound together, and follow or depend on each other; in which ſenſe we ſay, a ſyſtem of philoſophy, a ſyſtem of divinity, *&c.*

SYSTEM,

SYSTEM, in aſtronomy, denotes an hypotheſis or ſuppoſition of an arrangement of the ſeveral parts of the univerſe, whereby aſtronomers explain all the phænomena or appearances of the heavenly bodies, their motions, changes, &c. This is moreproperly called the ſyſtems of the world. Syſtem and hypotheſis have much the ſame ſignification, unleſs perhaps hypotheſis be a more particular ſyſtem, and ſyſtem a more general hypotheſis. See HYPOTHESIS.

The three moſt celebrated ſyſtems of the world are the copernican, the ptolemaic, and tychonic, the œconomy of each whereof may be ſeen under the articles COPERNICAN, PTOLEMAIC, and TYCHONIC.

SYSTEM, in poetry, denotes a certain hypotheſis, or ſcheme of religion, from which the poet is never to recede: *e. gr.* having made his choice either in the heathen mythology or in chriſtianity, he muſt keep the two apart, and never mix ſuch different ideas in the ſame poem.

SYSTEM, in muſic, denotes a compound interval, or an interval compoſed, or conceived to be compoſed, of ſeveral leſs, ſuch as the octave. See INTERVAL.

The word is borrowed from the antients, who call a ſimple interval, diaſtem; and a compound one, ſyſtem. See the article DIASTEM.

As there is not any interval in the nature of things, ſo we can only conceive any given interval as compoſed of, or equal to, the ſum of ſeveral others: this diviſion of intervals therefore only relates to practice, ſo that a ſyſtem is properly an interval which is actually divided in practice, and where along with the extremes we always conceive ſome intermediate terms. The nature of a ſyſtem will be very plain by conceiving it an interval whoſe terms are in practice taken either in immediate ſucceſſion, or the ſound is made to riſe or fall from one to the other, by touching ſome intermediate degrees, ſo that the whole is a ſyſtem or compoſition of all the intervals between one extreme and another. Syſtems of the ſame magnitude, and conſequently of the ſame degree of concord and diſcord, may yet differ in reſpect of their compoſition, as containing, and being actually divided into more or fewer intervals; and when they are equal in that reſpect, the parts may differ in magnitude. Laſtly, when they conſiſt of the ſame parts or leſſer intervals, they may differ as to the order and diſpoſition thereof between the two extremes.

There are ſeveral diſtinctions of ſyſtems, the moſt remarkable of which are concinnous or inconcinnous. Concinnous ſyſtems are thoſe which conſiſt of ſuch parts as are fit for muſic, and thoſe parts placed in ſuch an order between the extremes, as that the ſucceſſion of ſounds from one extreme to the other, may have a good effect. See CONCINNOUS.

The concinnous ſyſtems, according to Euclid, are diateſſaron, diapente, diapaſon; diapaſon and diateſſaron, diapaſon and diapente, and biſdiapaſon. See the articles DIATESSARON, DIAPENTE, &c.

Inconcinnous ſyſtems are thoſe wherein the ſimple intervals are inconcinnous, or badly diſpoſed between the two extremes. The inconcinnous, that author obſerves, are leſs than the fourth, and all thoſe ſituated between the above-mentioned ones.

A ſyſtem is either particular or univerſal. An univerſal ſyſtem is that which contains all the particular ſyſtems belonging to muſic, and makes what the antients call diagram, and we, the ſcale of muſic. See DIAGRAM, SCALE, GAMUT, &c.

The antients alſo diſtinguiſh ſyſtems into perfect and imperfect. The biſdiapaſon, or double octave, was reckoned a perfect ſyſtem becauſe, within its extremes are contained examples of all the ſimple and original concords, and all the variety of orders wherein their concinnous parts ought to be taken, which variety conſtitutes what they call ſpecies or figures of conſonances. All the ſyſtems leſs than the biſdiapaſon were reckoned imperfect. The double octave was called ſyſtema maximum and immutatum, becauſe they took it to be the greateſt extent or difference of time they could go in making melody, tho' ſome added a fifth to it for the greateſt ſyſtem: but the diapaſon, or ſimple octave, was reckoned the moſt perfect ſyſtem with regard to the agreement of its extremes, ſo that how many octaves ſoever were put into the greateſt ſyſtem, they were all to be conſtituted or ſubdivided the ſame way as the firſt; ſo that when we know how the octave is divided, we know the nature of the diagram or ſcale, the varieties whereof conſtitute the genera melodiæ, which are ſubdivided into ſpecies. See the articles GENUS and SPECIES.

SYSTEMATISTS,

SYSTEMATISTS, in botany, thoſe authors whoſe works in this ſcience are principally employed about the arranging plants into certain orders, claſſes, or genera.

SYSTOLE, in anatomy, the contraction of the heart, whereby the blood is drawn out of its ventricles into the arteries; the oppoſite ſtate to which is called the diaſtole, or dilatation of the heart. See the articles HEART, BLOOD, DIASTOLE, PULSE, *&c.*

The ſyſtole of the heart is well accounted for by Dr. Lower, who ſhews that the heart is a true muſcle, the fibres whereof are acted on like thoſe of other muſcles, by certain branches of the eight pair of nerves inſerted into it, which bring the animal ſpirits from the brain hither. By a flux of theſe ſpirits the muſcular fibres of the heart are inflated and thus ſhortened, the length of the heart diminiſhed, its breadth or thickneſs increaſed, the capacity of the venticles cloſed, the tendinous mouths of the arteries dilated, thoſe of the veins ſhut up by means of their valves, and the contained juice forcibly expreſſed into the orifices of the arteries. See the article MUSCLE, *&c.*

Dr. Drake adds to Dr. Lower's account, that the intercoſtal muſcles and diaphragm contribute to the ſyſtole, by opening the blood a paſſage from the right ventricle of the heart to the left, through the lungs, to which it could not otherwiſe paſs, becauſe the oppoſition the blood contained in that ventricle muſt neceſſarily have made to its conſtriction, is taken off. Both theſe authors make the ſyſtole the natural ſtate, or action of the heart, and the diaſtole the violent one. Boerhaave, on the contrary, makes the ſyſtole the violent, and the diaſtole the natural ſtate. See the articles CIRCULATION, CONTRACTION, ARTERY, *&c.*

SYSTYLE, in architecture, that manner of placing columns where the ſpace between the two fuſts conſiſt of two diameters, or four modules. See the articles COLUMN, DIAMETER, and MODULE.

SYZYGY, *ſyzygia*, in aſtronomy, a term equally uſed for the conjunction and oppoſition of a planet with the ſun. See CONJUNCTION and OPPOSITION.

On the phænomena and circumſtances of the ſyzygies a great part of the lunar theory depends. See MOON.

For, 1. It is ſhewn in the phyſical aſtronomy, that the force which diminiſhes the gravity of the moon in the ſyzygies, is double that which increaſes it in the quadratures: ſo that in the ſyzygies the gravity of the moon from the action of the ſun is diminiſhed by a part which is to the whole gravity as 1 to 89,36: for in the quadratures, the addition of gravity is to the whole gravity as 1 to 178,73. See QUADRATURE.

2. In the ſyzygies, the diſturbing force is directly as the diſtance of the moon from the earth, and inverſely as the cube of the diſtance of the earth from the ſun. And at the ſyzygies the gravity of the moon towards the earth receding from its center is more diminiſhed, than according to the inverſe ratio of the ſquare of the diſtance from that center. Hence, in the motion of the moon from the ſyzygies to the quadratures, the gravity of the moon towards the earth is continually increaſed, and the moon is continually retarded in its motion; and in the motion from the quadratures to the ſyzygies the moon's gravity is continually diminiſhed, and its motion in its orbit accelerated. See GRAVITATION.

3. Further in the ſyzygies the moon's orbit, or circle, round the earth, is more convex than in the quadratures, for which reaſon the moon is leſs diſtant from the earth at the former than the latter.

When the moon is in the ſyzygies, her apſides go backwards, or are retrograde. See the articles ORBIT, APSIS, and RETROGRADATION.

When the moon is in the ſyzygies, the nodes move in antecedentia faſteſt: then ſlower and ſlower, till they become at reſt, when the moon is in the quadratures. See the article NODE.

Laſtly, When the nodes are come to the ſyzygies, the inclination of the plane of the orbit is leaſt of all. See the article INCLINATION.

Add that theſe ſeveral irregularities are not equal in each ſyzygy, but all ſomewhat greater in the conjunction than in the oppoſition.

T

T or t, the nineteenth letter, and fifteenth conſonant of our alphabet, the ſound whereof is formed by a ſtrong expulſion of the breath through the mouth, upon a ſudden drawing back of the tongue from the fore-part of the palate, with the lips at the ſame time open. The proper ſound of this letter is that in *tan, ten, tin, tun, fat, pot, put, &c.* When it comes before *i*, followed by a vowel, it is ſounded like *s*, as in *nation, potion, &c.* When *h* comes after it, it has a two-fold ſound; one clear and acute, as in *thin, thief, &c.* the other more obtuſe and obſcure, as in *then, there, &c.*

In abbreviations, amongſt the roman writers, T. ſtands for Titus, Titius, *&c.* Tab. for Tabularius; Tab. P. H. C. Tabularius provinciæ Hiſpaniæ citerioris; Tar. Tarquinius; Ti. Tiberius; Ti. F. Tiberii filius; Ti. L. Tiberii libertus; Ti. N. Tiberii Nepos; T. J. A V. P. V. D. tempore judicem arbitrumve poſtulat ut det; T M. P. terminum poſuit; T M. D D. terminum dedicavit; Tr. trans, tribunus; Tr. M. or Mil. tribunus militum; T R. PL. DES. tribunus plebis deſignatus; T R. A E R. tribunus ærarii; T R V. C A P. triumviri capitales; T. P. or T R I B. P O T. tribunicia poteſtate; Tul. H. Tullus Hoſtilius.

Amongſt the antients, T. as a numeral, ſtood for one hundred and ſixty; and with a daſh at top, thus $\overline{T}$, it ſignified one hundred and ſixty thouſand. In muſic, T ſtands for tutti, all, or altogether. See the articles TUTTI and NUMERAL.

TABAGO, one of the Caribbee-iſlands in the American-ocean, one hundred and twenty miles ſouth of Barbadoes: weſt long. 59°, north lat. 11° 30′.

It is from this place that tabacco, or tobacco, a well known plant, takes its name. See TOBACCO.

TABARCA, an iſland on the coaſt of Barbary, in Africa, fifty miles weſt of Tunis: eaſt long. 8°, north lat. 36° 30′.

TABASCO, the capital of a province of the ſame name, ſituated on the bay of Campeachy, at the mouth of the river Tabaſco, one hundred and ſixty miles ſouth-weſt of Campeachy: weſt long. 95°, north lat. 18°.

TABBY, in commerce, a kind of rich ſilk which has undergone the operation of tabbying. See the next article.

TABBYING, the paſſing a ſilk or ſtuff under a calender, the rolls of which are made of iron or copper, variouſly engraven, which bearing unequally on the ſtuff renders the ſurface thereof unequal, ſo as to reflect the rays of light differently, making the repreſentation of waves thereon.

TABELLA, TABLET, in pharmacy, is much the ſame with troches and lozenges, being a ſolid preparation formed into a little cake, or maſs, of different figures, intended to diſſolve ſlowly, and generally made agreeable to the palate. This form is moſtly made uſe of for the more commodious exhibition of certain medicines, by fitting them to diſſolve ſlowly in the mouth, ſo as to paſs by degrees into the ſtomach, and hence theſe preparations have generally a conſiderable proportion of ſugar or other ſuch materials. They are calculated for children who are not eaſily prevailed on to take medicines in leſs agreeable forms. There are various kinds of them, as the tabellæ antacidæ, tabellæ anthelminticæ, tabellæ purgantes, *&c.* See TROCHE.

TABELLIO, in the roman law, an officer or ſcrivener, much the ſame with our notaries public, who are often called tabelliones in our antient law books. See the article NOTARY.

TABERNACLE, among the Hebrews, a kind of building, in the form of a tent, ſet up, by expreſs command of God, for the performance of religious worſhip, ſacrifices, *&c.* during the journeying of the Iſraelites in the wilderneſs; and, after their ſettlement in the land of Canaan, made uſe of for the ſame purpoſe till the building of the temple of Jeruſalem. It was divided into two parts, the one covered, and properly called the tabernacle; and the other open, called the court. The curtains which covered the tabernacle were made of linnen, of ſeveral colours, embroidered. There were ten curtains, twenty-eight cubits long and

four in breadth. Five curtains faſtened together made up two coverings, which covered all the tabernacle. Over theſe there were two other coverings; the one of goat-hair, and the other of ſheep-ſkins. The holy of holies was parted from the reſt of the tabernacle by a curtain made faſt to four pillars, ſtanding ten cubits from the end. The length of the whole tabernacle was thirty-two cubits, that is, about fifty feet; and the breadth twelve cubits, or nineteen feet. The court was a ſpot of ground one hundred cubits long, and fifty in breadth, encloſed by twenty columns, each twenty cubits high and ten in breadth, covered with ſilver, and ſtanding on copper baſes, five cubits diſtant from one another; between which, there were curtains drawn, and faſtened with hooks. At the eaſt end was an entrance, twenty cubits wide, covered with a curtain hanging looſe.

Feaſt of TABERNACLES, a ſolemn feſtival of the Hebrews, obſerved after harveſt, on the fifteenth day of the month Tiſri, inſtituted to commemorate the goodneſs of God, who protected the Iſraelites in the wilderneſs, and made them dwell in booths, when they came out of Egypt. On the firſt day of the feaſt, they began to erect booths of the boughs of trees, and in theſe they were obliged to continue ſeven days. The booths were placed in the open air, and were not to be covered with clothes, nor made too cloſe by the thickneſs of the boughs; but ſo looſe that the ſun and the ſtars might be ſeen, and the rain deſcend through them. For further particulars, as to the celebration of this feſtival, ſee Levit. ch. xxiii.

TABERNÆMONTANA, in botany, a genus of the *pentandria-monogynia* claſs of plants, the corolla whereof conſiſts of a ſingle infundibuliform petal: the tube is cylindric and long: the baſe and apex are both ventricoſe: the limb is divided into five linear obtuſe ſegments; the fruit is compoſed of two follicles bent horizontally, ventricoſe, and acuminated, formed of one valve, and containing one cell: the ſeeds are numerous, of an oblong oval figure, obtuſe, imbricated, and wrapped up in pulp.

TABES DORSALIS, in medicine, a diſtemper which, according to a late author, is a particular ſpecies of a conſumption, the proximate cauſe of which is a debility of the nerves. See the article CONSUMPTION.

Of the ſeveral kinds of conſumptions incident to human bodies, the tabes dorſalis is the ſloweſt in its progreſs, but the moſt melancholy in its circumſtances; and, unleſs timely obviated, for the moſt part fatal. This diſeaſe is only incident to young men of ſalacious diſpoſitions, and proceeds from too early venery, an immoderate uſe of it, or pollutions. It ſeems therefore to derive its origin from too frequent venereal ſpaſms; and the immoderate loſs of ſeminal fluid has a conſiderable ſhare in producing the effect. The ſymptoms of the tabes dorſalis are involuntary, nocturnal, ſeminal emiſſions, a pain in the back, and often in the head, a formication of the ſpine, an aching pain, rolling and hanging down of the teſticles, a weakneſs of memory and ſight, and a mucous diſcharge from the urethra, eſpecially after ſtraining at the diſcharge of the excrements. The mucous diſcharge here mentioned is called, by Hippocrates, liquidum ſemen, but it is nothing but the mucus of the proſtrate gland. This diſeaſe is farther attended with great melancholy and dejection of mind, and a gutta ſerena often follows. The eyes grow hollow, the viſage meagre and thin, the body emaciated and weak, a palpitation of the heart, and ſhortneſs of breath, ſucceed with a concourſe of hectical complaints, ending in death.

For the cure of this diſtemper a regularity of the non-naturals is of the utmoſt importance. Good air, rather cool than hot, is of great uſe. As to diet, high-ſeaſoned meats, ſpiritous and fermented liquors, ſhould be avoided. No food is ſo beneficial as milk: chocolate is alſo eſteemed good, in ſuch quantities as to ſit eaſy on the ſtomach. Animal food of eaſy digeſtion, at dinner, does no harm. Suppers ſhould be avoided, at leaſt milk only ſhould be then taken, about two hours before going to bed. Sleep muſt be little, and in due ſeaſon; that is, the patient ſhould go to bed and riſe early. Indulgence in bed in a morning is hurtful. The general rule ſhould be to riſe immediately upon waking; which, though irkſome at firſt, will by cuſtom be made familiar and agreeable. Moderate exerciſe, or ſuch as the patient's ſtrength will admit of without wearineſs, ought to be uſed.

Some

Some recommend riding, eſpecially a long journey, by ſuch daily portions as to avoid extraordinary fatigue. The ſecretions of the body, if out of order, ſhould be regulated, and the patient ſhould be entertained with cheerful company. As to the medicines, the claſſes of balſamics and aſtringents are chiefly uſeful. Among the latter, the peruvian bark, either in ſubſtance, extract, or tincture, the acid elixir of vitriol, and the tincture ſaturnia, or antiphthyſica, are the moſt efficacious. Strengthening plaſters may alſo be laid on the loins; and, chief of all, the cold bath ſhould be uſed.

TABLATURE, in anatomy, a diviſion, or parting, of the ſkull into two tables. See the article SKULL.

TABLATURE, *tablatura*, in muſic, is, in general, when, to expreſs the ſounds or notes of a compoſition, we uſe the letters of the alphabet, or any other characters not uſed in the modern muſic.

But, in a ſtricter ſenſe, tablature is the manner of writing a piece for the lute, theorba, guittar, viol, or the like, which is done by writing on ſeveral parallel lines, (each of which repreſents a ſtring of the inſtrument) certain letters of the alphabet, whereof A marks that the ſtring is to be ſtruck open, that is, without putting the finger of the left hand upon the neck; B ſhews that one of the fingers is to be put on the firſt ſtop, C on the ſecond, D on the third, and ſo on through the octave. The tablature of the lute is uſually wrote in letters of the alphabet, and that of the harpſicord in the common notes.

TABLE, *tabula*, a moveable piece of furniture, uſually made of wood or ſtone, and ſupported on pillars, or the like, for the commodious reception of things placed thereon.

TABLE, in architecture, a ſmooth ſimple member, or ornament, of various forms, but moſt uſually in that of a long ſquare. A projecting-table is that which ſtands out from the naked of the wall, pedeſtal, or other matter it adorns. Raked-table, is that which is hollow in the die of a pedeſtal, or elſewhere, and is uſually encompaſſed with a moulding. Razed-table, is an emboſſment in a frontiſpiece for the putting an inſcription, or other ornament, in ſculpture. This is what M. Perrault underſtands by abacus in Vitruvius. Crowned-table, that which is covered with a corniche, and in which a baſſo relievo is cut, or a piece of black marble incruſtated for an inſcription. Ruſticated-table, that which is picked, and whoſe ſurface ſeems rough, as in grottos, *&c.*

TABLE, in perſpective, denotes a plain ſurface, ſuppoſed to be tranſparent, and perpendicular to the horizon. It is always imagined to be placed at a certain diſtance between the eye and the objects, for the objects to be repreſented thereon by means of the viſual rays paſſing from every point thereof through the table to the eye; whence it is called perſpective-plane.

TABLE, in anatomy. The cranium is ſaid to be compoſed of two tables, or laminæ, *i. e.* it is double, as if it conſiſted of two bones laid over one another. See the article SKULL.

TABLE *of Pythagoras*, or *Multiplication*-TABLE. See MULTIPLICATION.

Laws of the twelve TABLES, were the firſt ſet of laws of the Romans, thus called either by reaſon the Romans then wrote with a ſtyle on thin wooden tablets covered with wax, or rather, becauſe they were engraven on tables, or plates of copper, to be expoſed in the moſt noted part of the public forum. After the expulſion of the kings, as the Romans were then without any fixed or certain ſyſtem of law, at leaſt had none ample enough to take in the various caſes that might fall between particular perſons, it was reſolved to adopt the beſt and wiſeſt laws of the Greeks. One Hermodorus was firſt appointed to tranſlate them, and the decemviri afterwards compiled and reduced them into ten tables. After a world of care and application, they were at length enacted and confirmed by the ſenate and an aſſembly of the people, in the year of Rome 303. The following year they found ſomething wanting therein, which they ſupplied from the laws of the former kings of Rome, and from certain cuſtoms which long uſe had authoriſed: all theſe being engraven on two other tables made the law of the twelve tables, ſo famous in the roman juriſprudence, the ſource and foundation of the civil or roman law.

TABLES *of the law*, in jewiſh antiquity, two tables on which were written the decalogue, or ten commandments, given by God to Moſes on Mount Sinai. See the article DECALOGUE.

Many queſtions have been ſtarted about theſe tables, as concerning their matter, form, number, author, and contents. Some ſuppoſe them to have been made of wood, others of precious ſtone. Theſe again are divided; ſome ſuppoſing them to have been of ruby, and others of carbuncle. Some oriental authors pretend they were ten in number, and others ſeven, but the Hebrews acknowledge no more than two. Moſes obſerves, that theſe tables were written on both ſides: many think they were tranſparent, ſo that they might be read through. others are of opinion that the ſame ten commandments were written on each of the two tables: and others, that the ten were divided, five being written on one table and five on the other. Moſes expreſly ſays that theſe tables were written by the hand of God. Some underſtand this literally, others aſcribe it to the miniſtry of an angel, and others explain it by an order of God to Moſes himſelf, to write them. The Mahometans ſay that God commanded the archangel Gabriel to make uſe of the pen, which is the invocation of the name of God, and of the ink which is taken out of the river of light, and therewith to write the tables of the law. When Moſes brought theſe tables down from the mount, and ſaw the idolatry into which the children of Iſrael had fallen, he dropt them out of his hand, and by the fall they were broken to pieces; but this loſs was repaired by the ſecond tables which God gave to Moſes, and in which he commanded him to write down the words of the covenant which he had made with Iſrael. From hence ſome conclude that theſe latter tables were not written by the hand of God, though the firſt were. But Moſes takes expreſs notice that God himſelf wrote them; whence it follows either that they were both written by the finger of God, or that neither of them was ſo written.

New TABLES, *tabulæ novæ*, an edict occaſionally publiſhed in the roman commonwealth, for the aboliſhing all kinds of debts and annulling all obligations.

TABLE, among the jewellers. A table-diamond, or other precious ſtone, is that whoſe upper ſurface is quite flat, and only the ſides cut in angles; in which ſenſe a diamond, cut table-wiſe, is uſed in oppoſition to a roſe-diamond. See the article DIAMOND.

TABLE-GLASS. See GLASS.

TABLE is alſo uſed for an index or repertory put at the beginning or end of a book, to direct the reader to any paſſage he may have occaſion for: thus we ſay table of matters, table of authors quoted, *&c.* Tables of the Bible are called concordances. See the article CONCORDANCE.

TABLE *of houſes*, among aſtrologers, certain tables ready drawn up for the aſſiſtance of practitioners in that art, for the erecting or drawing of figures or ſchemes. See the article HOUSE.

TABLE, in mathematics, ſyſtems of numbers calculated to be ready at hand for the expediting aſtronomical, geometrical, and other operations: thus we ſay tables of the ſtars; tables of ſines, tangents, and ſecants; tables of logarithms, rhumbs, *&c.* ſexagenary tables; loxodromic tables, *&c.* See the articles CANON, CATALOGUE, LOGARITHM, RHUMB, SEXAGENARY, *&c.*

Aſtronomical TABLES, are computations of the motions, places, and other phænomena of the planets, both primary and ſecondary.

The eldeſt aſtronomical tables are thoſe of Ptolomy, found in his Almageſt; but theſe now agree no longer with the heavens. In 1252, Alphonſo XI. king of Caſtile, undertook the correcting them, whence aroſe the alphonſine tables: but the deficiency of theſe was ſoon perceived by Regiomontanus and Purbachius; upon which the former of theſe, and after him Waltherus, and Warnerus, applied themſelves for the further amending them: but died before they finiſhed them. Copernicus calculated tables from his own obſervations and theories, from which Eraſmus Reinholdus afterwards compiled the prutenic tables. From Tycho's theories, Longomontanus calculated tables, now called the Daniſh Tables: and Kepler likewiſe, from the ſame, in 1627, publiſhed the Rudolphine Tables, which are now much eſteemed. Theſe were afterwards, in 1650, turned into another form by Maria Cunitia, whoſe aſtronomical tables, comprehending the effect of Kepler's Phyſical Hypotheſis, are exceedingly eaſy, and ſatisfy all the phænomena without any trouble of calculation, or any mention of logarithms, ſo that the Rudolphine calculus is hereby greatly improved. Other tables are the philolaic tables of Bullialdus;

Bullialdus; the britannic tables of Vincent Wing, calculated on Bullialdus's hypotheſis; the britannic tables of John Newton; the french ones of count de Pagan; the caroline tables of Street, all calculated on Dr. Ward's hypotheſis; and the novalmageſtic tables of Ricciolus. Among theſe laſt, the philolaic and caroline tables are eſteemed the beſt. Among the lateſt tables are the ludovician, publiſhed in 1702, by M. de la Hire, wholly from his own obſervations, and without the aſſiſtance of any hypotheſis; thoſe of Caſſini in 1738; and Dr. Halley laboured to perfect another ſet of tables.

TABLE, in heraldry. Coats, or eſcutcheons containing nothing but the mere colour of the field, and not charged with any bearing or moveable, are called *tables d'attente*, tables of expectation, or *tabulæ raſæ*.

TABLET, *tabella*, in pharmacy. See the article TABELLA.

TABLING *of fines*, the making a table for every county, where his majeſty's writs run, containing the contents of every fine paſſed each term. This is to be done by the chirographer of fines of the court of common pleas, whoſe duty it is every day of the next term, after the ingroſſing of any ſuch fine, to fix theſe tables in ſome open place of the ſaid court, during the time of its ſitting; and he is likewiſe to deliver to the ſheriff of every county, his under-ſheriff, or deputy, fairly wrote in parchment, a perfect copy of the table ſo made for that county, in the term next after the aſſizes, to be ſet up in an open place of that court, and to continue there ſo long as the juſtices ſhall ſit, and in caſe either the ſheriff, or chirographer, fails herein, he is liable to 5 l. penalty.

TABOR, *tabourin*, a ſmall drum. See the article DRUM.

TABORITES, or THABORITES, a branch or ſect of the antient Huſſites. They carried the point of reformation farther than Huſs had done, rejected purgatory, auricular confeſſion, the unction of baptiſm, tranſubſtantiation, &c. They reduced the ſeven ſacraments of the Romaniſts to four, *viz.* baptiſm, the euchariſt, marriage, and ordination.

TABRISTAN, a province of Perſia, ſituated on the northern ſhore of the caſpian ſea, having the province of Aſtrabat on eaſt, and Gilan on the weſt; being part of the antient Hyrcania.

TACAMAHACA, in pharmacy, a ſolid reſin, improperly called a gum, in the ſhops it is of a fragrant and peculiar ſmell, and is of two kinds; the one called the ſhell-tacamahaca, which is the fineſt; the other, which is an inferior kind, being termed rough-tacamahaca, or tacamahaca in grains.

The ſhell-tacamahaca is a concreted reſin, of a fatty appearance, and ſomewhat ſoft, ſo as eaſily to receive an impreſſion from the finger; at leaſt, this is its ſtate, when tolerably freſh. In time it grows hard and friable as common reſin; but it is then to be rejected, as having loſt much of its virtue. It is of a pale, browniſh, white colour, ſometimes with a yelloviſh, ſometimes with a greeniſh caſt. It is moderately heavy, very inflammable, and of a very fragrant ſmell of a peculiar kind, in which ſomething like the aromatic ſcent of lavender, and the perfume of amber greaſe, may be diſtinguiſhed, as mixed with a reſinous flavour. Its taſte is very aromatic and agreeable, though very acrid.

The common or grain-tacamahaca, called alſo coarſe tacamahaca, by way of diſtinction from the former fine kind, which is called tacamahaca ſublimis by ſome, is a dry, but ſomewhat fattiſh reſin, ſent over to us either in looſe granules, or in maſſes formed of ſuch. It is of a whitiſh colour variegated with yelloviſh, reddiſh, or greeniſh ſpots. Some of the granules are ſimply of one or other of theſe colours; others are variegated with two or more of them. It is of a fragrant ſmell, reſembling that of the ſhell-tacamahaca, but leſs perfumed, and is of an acrid, aromatic, bitteriſh taſte.

Tacamahaca is the gum of a tall tree, in the manner of its growth much reſembling the poplar: its leaves are broad and ſerrated at the edges, and terminate in a ſharp point: the flowers have not been yet deſcribed, but it is ſaid to be ſmall and roundiſh, containing a kernel not unlike that of a peach-ſtone.

Some greatly commend tacamahaca in diſorders of the breaſt and lungs; but, at preſent, it is very rarely uſed internally. Externally, however, it is in repute for ſoftening tumours, and mitigating pain and aches. Applied to the navel, it is ſaid to relieve women in hyſteric complaints; and applied in the ſame manner to the region of the ſtomach, it aſſiſts digeſtion, and expels flatuſes: it is alſo

an

an ingredient in ſome of the ſhop-compoſitions.

TACHYGRAPHY, *ταχυγραφια*, the art of writing faſt, or of ſhort-hand; of which authors have invented ſeveral methods. See BRACHYGRAPHY.

TACK, in a ſhip, a great rope having a wale-knot at one end, which is ſeized or faſtened into the clew of the ſail; ſo is reefed firſt through the cheſſe-trees, and then is brought through a hole in the ſhip's ſide. Its uſe is to carry forward the clew of the ſail, and to make it ſtand cloſe by a wind: and whenever the ſails are thus trimmed, the main-tack, the fore-tack, and mizen-tack, are brought cloſe by the board, and haled as much forward on as they can be.

The bowlings alſo are ſo on the weather-ſide; the lee-ſheets are haled cloſe aft, and the lee-braces of all the ſails are likewiſe braced aft. Hence they ſay, a ſhip ſails or ſtands cloſe upon a tack, *i. e.* cloſe by the wind. The words of command are, hale aboard the tacks, *i. e.* bring the tack down cloſe to the cheſſe-trees. Eaſe the tack, *i. e.* ſlacken it, or let it go, or run out. Let riſe the tack, *i. e.* let all go out.

The tacks of a ſhip are uſually belayed to the bitts, or elſe there is a chevil on purpoſe to faſten them.

TACK-ABOUT, in the ſea-language, is to turn the ſhip about, or bring her head about, ſo as to lie the contrary way.

TACKLE, or TACKLING, among ſeamen, denotes all the ropes or cordage of a ſhip, uſed in managing the ſails, *&c.* In a more reſtrained ſenſe, tackles are ſmall ropes running in three parts, having at one end a pendant and a block; and at the other end, a block and hook, to hang goods upon that are to be heaved into the ſhip or out of it. See the article SHIP.

TACTICS, in the art of war, is the method of diſpoſing forces to the beſt advantage in order of battle, and of performing the ſeveral military motions and evolutions.

TADCASTER, a market-town of Yorkſhire, ten miles ſouth-weſt of York.

TADMOR, the ſame with Palmyra. See the article PALMYRA.

TADORNA, in ornithology, a beautiful ſpecies of anas, nearly equal to the gooſe in ſize, and variagated with white, and with a longitudinal ſpot of grey on the belly: it is frequent on the coaſts of Wales and Lancaſhire.

TADPOLE, a young frog, before it has diſengaged itſelf from the membranes that envelope it in its firſt ſtage of life. See the article FROG.

TÆNIA, the TAPE-WORM, in zoology, a genus of worms, the body of which is of an oblong form, and compoſed of evident joints or articulations, in the manner of the links of a chain, or beads of a necklace.

The tape-worm grows frequently to ſeveral ells in length, and its articulations are a third of an inch long each. There is alſo another ſmall ſpecies, which never exceeds two inches in length, and is commonly not more than half an inch.

TÆNIA, in architecture, a member of the doric capital, reſembling a ſquare fillet, or reglet: it ſerves inſtead of a cymatium. See CYMATIUM.

TAFALA, a town of Navarre, in Spain, twenty-two miles ſouth of Pampeluna: weſt long. 1° 40′, north lat. 42° 45′.

TAFFAREL, or TAFFEREL, in a ſhip, the uppermoſt rail or frame, abaft over the poop. See the article SHIP.

TAFFETY, in commerce, a fine ſmooth ſilken ſtuff, remarkably gloſſy. See SILK. There are taffeties of all colours, ſome plain, and others ſtriped with gold, ſilver, *&c.* others chequered, others flowered, *&c.* according to the fancy of the workmen.

TAFILET, a town of Biledulgerid, in Africa, ſituated three hundred miles ſouth-eaſt of Morocco: weſt long. 5°, north lat. 28°.

TAGETES, *French* MARYGOLD, or *African* MARYGOLD, in botany, a genus of the *ſyngeneſia polygamia ſuperflua* claſs of plants, with a compound radiated flower, made up of numerous tubuloſe and ſemiquinquifid hermaphrodite corollulæ on the diſc, and ſeveral ligulated female flowers in the radius or verge: there is a ſingle ſeed ſucceeds each hermaphrodite corollula; all which are contained in the cup, which cloſes for that purpoſe. See plate CCLXVIII. fig. 1.

TAGUS, the largeſt river of Spain, which, taking its riſe on the confines of Arragon, runs ſouth-weſt through the provinces of New Caſtile and Eſtremadura; and paſſing by the cities of Aranjuez, Toledo, and Alcantara, and then croſſing Portugal, forms the harbour of Liſbon, at which city it is about three miles over; and about eight or ten miles below this, it falls into the Atlantic ocean.

TAJACU, the MUSK-HOG, in zoology, a ſpecies of hog, with a cyſt on the back, and no tail: it is a native of Mexico, and is ſmaller than the common hog. On the middle of the head there ariſes a kind of creſt, compoſed of a large cluſter of briſtles; and on the middle of the back there is a kind of cyſt or gland, with an opening at the upper part, in which is ſecreted a perfumed fluid matter, of a mixt ſmell between that of muſk and civet; whence the engliſh name.

TAIL, *cauda*, the train of a beaſt, bird, or fiſh; which, in land animals, ſerves to drive away flies, *&c.* and in birds and fiſhes, to direct their courſe, and aſſiſt them in aſcending or deſcending in the air or water. See the articles QUADRUPED, BIRD, FISH, *&c.*

TAIL *of a comet*, denotes the luminous rays iſſuing from a comet towards that part of the heavens, from whence it ſeems to move. See COMET.

TAIL *of the trenches*, in the art of war, is the poſt or place, where the beſiegers begin to break ground. See TRENCH.

Dragon's TAIL, in aſtronomy, the deſcending node of a planet. See NODE.

Horſe's TAIL, in the cuſtoms of the eaſtern nations, is the enſign, or flag, under which they make war.

TAIL, or FEE-TAIL, in law, is a limited eſtate, or fee; oppoſed to fee-ſimple. See the article FEE.

Fee-tail is an inheritance whereof a perſon is ſeiſed, to him and the heirs of his body, begotten or to be begotten; ſo that the tenant in tail cannot alien, either before or after iſſue had, or forfeit ſuch lands, longer than for his own life: becauſe an eſtate in tail always remains to the iſſue of the donee and his heirs; or, in caſe he has no iſſue, then to the donor and his heirs.

Eſtates-tail of lands are either general or ſpecial. General tail is where lands or tenements are given to a man, or woman, and the heirs of either of their bodies begotten; which is called a general tail, becauſe, however many wives a perſon that holds by this title ſhall have one after another in lawful marriage, his iſſue by them ſeverally are all capable of inheriting in their turns: and if the woman has iſſue by ſeveral huſbands, they may all inherit after each other, as heirs of her body. A tail ſpecial, on the other hand, is when lands, *&c.* are limited to a man and his wife, and the heirs of their two bodies begotten, ſo that the children by a ſecond wife, or former wife, ſtand abſolutely excluded.

Where lands are granted to a man and his heirs-male, or heirs-female, of his body begotten, ſuch male or female iſſue ſhall only inherit purſuant to the limitation: and hence it is, that where a grant is to a man and the heirs male of his body begotten, and he has iſſue a daughter, who has a ſon, this ſon cannot inherit the eſtate, becauſe he cannot prove his deſcent by heirs-male.

Where lands, *&c.* are given to a huſband and wife, and the heirs of their two bodies begotten in ſpecial tail, and one of them dies without iſſue had between them; in ſuch caſe, the ſurvivor ſhall hold the lands for life, as tenant in tail after poſſibility of iſſue extinct, as the lawyers call it.

Nevertheleſs, as great miſchiefs were occaſioned by inheritances being intailed; as defrauding of creditors, *&c.* diſobedience of ſons, when they knew they could not be diſinherited, and the like, the judges found out a way to bar an intailed eſtate with remainders over, by a feigned recovery. See RECOVERY.

TAILLEBOURG, a town of Guienne, in France, thirty miles ſouth-eaſt of Rochelle.

TAILLOIR, in architecture, a term ſometimes uſed for abacus. See ABACUS.

TAINE, a port-town of Roſs-ſhire, in Scotland, ſituated on the ſouth ſide of the frith of Sutherland, ſeven miles north of Cromartie: weſt long. 3° 38′, north lat. 58°

TAINT, in law, ſignifies either a conviction; or the perſon convicted, of ſome treaſon, felony, *&c.* See TREASON and FELONY.

TAITCHEU, a city and port-town of China, ſituated on the coaſt of the Pacific Ocean, in eaſt long. 121°, north lat. 29°.

TALAMONE, a port-town of Tuſcany, fifteen miles north of Orbitello.

TALAVERA, a town of Eſtremadura, in Spain, fourteen miles eaſt of Badajos.

TALC, or TALK, in natural hiſtory, a large claſs of foſſile bodies, compoſed of broad, flat, and ſmooth laminæ or plates, laid evenly and regularly on one another; eaſily fiſſile, according to the ſite of theſe plates, but not all ſo in any other direction; flexile and elaſtic; bright, ſhining, and tranſparent; not giving fire with ſteel, nor fermenting with acid

menſtrua, and ſuſtaining the force of a violent fire without calcining.

Talcs are divided into two orders; the firſt of which are compoſed of plates of great extent, each making ſingly the whole horizontal ſurface of the maſs.

The genera of the firſt order are two: the firſt is of thoſe compoſed of viſibly ſeparate plates of extreme thinneſs; and each fiſſile again into a number of others yet finer: the talcs of this genus are called ſpeculares. See plate CCLXVII. fig. 1.

The ſecond genus is of thoſe which are compoſed of ſeparate plates of conſiderable thickneſs, and thoſe not fiſſile into any thinner. The talcs of this genus are called hyalinæ, *ibid.* fig. 2.

The talcs of the ſecond order are thoſe compoſed of ſmall plates, in form of ſpangles, irregularly diſpoſed, and uſually many of them concurring in different directions, to the formation of one of the ſurfaces of the maſs.

The genera of the ſecond order are alſo two: the firſt is of thoſe compoſed of ſmall plates, in form of ſpangles, each fiſſile into many yet finer and thinner ones: the talcs of this genus are called bractearia. *ibid.* fig. 3, and 4.

The ſecond genus is of thoſe compoſed of ſmall plates in form of ſpangles, which are moderately thick, and are either not fiſſile at all, or are only ſo to a certain degree, or into a ſmall number of others yet thick ones, and thoſe no farther fiſſile: the talcs of this laſt genus are called elaſmides. *ibid.* fig. 5, and 6.

Talcs, though of no manner of uſe in medicine, are nevertheleſs uſed in many arts and manufactures; for a farther account of which, ſee SPECULARIS, *&c.*

Philoſophic TALC, an appellation given by ſome to the flowers of zink. See ZINK.

TALENT, money of account amongſt the antients. See the articles COIN and MONEY.

Amongſt the Jews, a talent in weight was equal to 60 maneh, or 113 lb. 10 oz. 1 dwt. 10 $\frac{2}{7}$ gr.

TALES, in law, a word uſed for a ſupply of men impannelled on a jury, and not appearing; or upon appearance, being challenged for the plaintiff or defendant, as not indifferent; in which caſe the judge, upon motion, of courſe grants a ſupply to be made by the ſheriff, of ſome perſons there preſent, equal in reputation to thoſe that are impanelled. Where a perſon has had one tales, he may have another, but not have the latter to contain ſo many as the former, becauſe the firſt tales muſt be under the number of the principal panel, except in the caſe of appeal; and in like manner every tales is to be leſs than other, until the whole number be made uſe of, are perſons without exception. There are two kinds of tales, the one de circumſtantibus, and the other a decem tales: that of circumſtantibus, is, when a full jury does not appear at the niſi prius, or ſo many are challenged as not to have a full jury; on which motion being made, the judge will grant this tales, which the ſheriff immediately returns into court. A decem tales is when a full jury does not appear at a trial at bar, in which caſe this writ goes out to the ſheriff, commanding him to apponere decem tales.

TALIO, *lex talionis*, a ſpecies of puniſhment in the moſaic law, whereby an evil is returned ſimilar to that committed againſt us by another; hence that expreſſion eye for eye, tooth for tooth. This law was at firſt inſerted in the twelve tables amongſt the Romans, but afterwards ſet aſide, and a power given to the prætor to fix upon a ſum of money for the damage done.

TALISMANS, magical figures cut or engraved with ſuperſtitious obſervations on the characteriſms and configurations of the heavens, to which ſome aſtrologers have attributed wonderful virtues, particularly that of calling down celeſtial influences. The taliſmans of Samothrace, ſo famous of old, were pieces of iron formed into certain images, and ſet in rings; theſe were eſteemed preſervatives againſt all kinds of evils. There were likewiſe taliſmans taken from vegetables, and others from minerals. There is a general diviſion of taliſmans into three kinds. 1. Aſtronomical, which are known by the ſigns or conſtellations of the heavens engraven thereon, with other figures, and ſome unintelligible characters. 2. Magical, which bear very extraordinary figures, with ſuperſtitious words, and names of angels unheard of. 3. Mixt, which conſiſt of ſigns and barbarous names, but without ſuperſtitious ones, or names of angels unknown.

There have been ſome rabbins who maintained, that the brazen ſerpent raiſed by Moſes, was a taliſman.

TALK, or TALC, in natural hiſtory. See the article TALC.

TALLAGE, in law-books, is a general name for all taxes: hence, *tallagium facere*,

TALCS.

Order 1.

Fig. 1 Specularis

Fig. 2 Hyalina

Order 2

Fig. 3. Bractearium.

Fig. 4. Bractearium.

Fig. 5. Elasmis.

Fig. 6. Elasmis

J. Jeffreys sculp.

facere, is to give up accounts into the exchequer, where the method of accounting is by tallies. See TALLY.

TALLARD, a town of Dauphine, in France, ſituated on the river Durance, forty-ſeven miles ſouth of Grenoble.

TALLEMONT, a town of Guienne, in France, ſituated near the mouth of the river Garonne, forty miles ſouth of Rochelle.

TALLOW, in commerce, the fat of certain animals, melted down and clarified, ſo as to be fit for making candles, *&c.* See the article CANDLE.

Tallow, imported from abroad, pays for every hundred weight, a duty of 7s. $10\frac{75}{100}$ d. and draws back, on being exported again, 7 s. 6 d.

TALLOW-TREE, a remarkable tree, growing in great plenty in China; ſo called, from its producing a ſubſtance like tallow, which ſerves for the ſame purpoſe: it is about the height of a cherry-tree, its leaves in form of a heart, of a deep ſhining red colour, and its bark very ſmooth. Its fruit is incloſed in a kind of pod, or cover like a cheſnut, and conſiſts of three round white grains, of the ſize and form of a ſmall nut, each having its peculiar capſula, and within a little ſtone. This ſtone is encompaſſed by a white pulp which has all the properties of true tallow, both as to conſiſtence, colour, and even ſmell; and accordingly the Chineſe make their candles of it; which would doubtleſs be as good as thoſe in Europe, if they knew how to purify their vegetable, as well as we do our animal, tallow.

All the preparation they give it, is to melt it down and mix a little oil with it, to make it ſofter and more pliant. It is true their candles made of it yield a thicker ſmoke, and a dimmer light, than ours; but thoſe defects are owing in a great meaſure to the wicks, which are not of cotton, but only a little rod, of dry light wood covered with the pith of a ruſh wound round it; which, being very porous, ſerves to filtrate the minute parts of the tallow, attracted by the burning ſtick, which by this means is kept alive.

TALLY, in law, a piece of wood cut in two parts, whereon accounts were antiently kept, by means of notches; one part of the tally being kept by the debtor, and the other by the creditor.

As to the tallies of loans, one part thereof is kept in the exchequer, and the other part given to particular perſons in lieu of an obligation for the monies they have lent to the government on acts of parliament. This laſt part is called the ſtock, and the former the counter ſtock, or counter tail.

Tallies of debt, are a kind of acquittance for debt paid to the king, upon the payment of which every debtor receives one of theſe tallies; and on carrying the ſame to the clerk of the pipe-office, has an acquittance there given him, on parchment, for his full diſcharge.

Tallies of reward, were an allowance made to ſheriffs for ſuch ſums as they have caſt upon them in their accounts, but cannot levy.

TALMUD, or THALMUD, among the Jews, a collection of the doctrines of their religion and morality. It is the *corpus juris*, or body of the laws and cuſtoms of the Jews, who eſteem it equal to the ſcriptures themſelves. See CARAITES, RABBI, GEMARA, *&c.*

TALON, in architecture, a kind of moulding, which conſiſts of a cymatium, crowned with a ſquare fillet; frequently found to terminate joiners-work, as thoſe of doors, windows, *&c.*

TALPA, the MOLE, in zoology. See the article MOLE.

TALPA, in ſurgery, a name given to encyſted tumours, when ſituated under the ſcalp.

TALUS, in anatomy, the ſame with the aſtragalus. See ASTRAGALUS.

TALUS, or TALUT, in architecture, the inclination or ſlope of a work; as of the outſide of a wall, when its thickneſs is diminiſhed by degrees, as it riſes in height to make it the firmer.

TALUS, in fortification. Talus of a baſtion, or rampart, is the ſlope or diminution allowed to ſuch a work, whether it be of earth or ſtone, the better to ſupport its weight.

The exterior talus of a work, is its ſlope on the ſide towards the country; which is always made as little as poſſible, to prevent the enemies ſcalado; unleſs the earth be bad, and then it is abſolutely neceſſary to allow a conſiderable talus for its parapet. The interior talus of a work is its ſlope on the inſide towards the place.

TAMALAPATRA, in botany, *&c.* the ſame with the folium indicum. See the article FOLIUM INDICUM.

TAMANDUA, in zoology, the ſame with the myrmecophaga. See the article MYRMECOPHAGA.

TAMAR, a river, which divides Devonſhire from Cornwall, running from north to ſouth.

TAMARIND, *tamarindus*, in botany, a genus of the *triandria-monogynia* claſs of plants, the flower of which conſiſts of three or four ovated and equal petals; and its fruit is a long compreſſed pod, containing three angulated and compreſſed ſeeds.

The pod is made up of a double rind, or membrane, between which is a pulpy matter; which taken in the quantity of two or three drams, or an ounce or more, proves gently laxative or purgative; and at the ſame time, by its acidity, quenches thirſt, and allays immoderate heat. It increaſes the action of the purgative ſweets, caſſia and manna, but weakens that of the reſinous cathartics: ſome have ſuppoſed it capable of abating the virulence of antimonial preparations; but experience ſhews, that it has a contrary effect, and that all vegetable acids augment their power: it is alſo recommended in diarrhœas, and nephritic complaints, and is ſaid to cure the jaundice without the aſſiſtance of any other medicine.

TAMARISK, *tamariſcus*, or *tamarix*, a genus of trees belonging to the *pentandria-trigynia* claſs of plants; its flower is roſaceous, and conſiſts of five ovated, concave and obtuſe, patent petals: the fruit is an oblong and triquetrous capſule, containing a great many very ſmall and pappoſe ſeeds.

The bark and leaves of the tamariſk-tree are moderately aſtringent, but never preſcribed in the preſent practice.

TAMBAC, a mixture of gold and copper, which the people of Siam hold more beautiful, and ſet a greater value on, than gold itſelf.

TAMBOUR, in architecture, a term applied to the corinthian and compoſite capitals, as bearing ſome reſemblance to a drum, which the french call tambour.

TAMBOUR is alſo uſed for a little box of timber-work covered with a ceiling, within-ſide the porch of certain churches, both to prevent the view of perſons paſſing by, and to keep off the wind, &c. by means of folding doors.

TAMBOUR alſo denotes a round courſe of ſtone, ſeveral whereof form the ſhaft of a column, not ſo high as a diameter.

TAME, a market-town of Oxfordſhire, ſituated on the river Tame, ten miles eaſt of Oxford.

TAMNUS, or TAMUS, BLACK BRYONY, in botany, a genus of the *dioecia-hexandria* claſs of plants, without any corolla: the calyx is divided into ſix parts; the fruit is a trilocular berry, ſituated below the calyx, and containing two ſeeds in each cell.

The root of this plant is ſaid to be ſomewhat poiſonous, whence it frequently proves of bad conſequence, when adminiſtered inſtead of the white bryony.

TAMOATA, in ichthyology, the name by which ſome call the callichthys or ſtromateus. See STROMATEUS.

TAMPION, or TOMPION, among gunners, a plug to ſtop the mouths of cannons, mortars, &c. to keep them clean within.

TAMUS, or TAMNUS. See TAMNUS.

TAMWORTH, a borough of Staffordſhire, ſituated twenty miles ſouth-eaſt of Stafford.

It ſends two members to parliament.

TAN, the bark of the oak, chopped and ground, in a tanning-mill, into a coarſe powder, to be uſed in the tanning of leather. See TANNING.

New tan is the moſt eſteemed; for when old and ſtale it loſes a great deal of its effects, which conſiſt in condenſing and cloſing the pores of the ſkin, ſo that the longer the ſkins are kept in tan, the greater ſtrength and firmneſs they acquire. In effect, not only the bark, but every part of the oak-tree, of what age and growth ſoever, and all oaken coppice, &c. cut in barking-time, make good tan, as good at leaſt as the beſt bark. This when got, is to be well dried in the ſun, houſed dry, and kept ſo. When it is to be uſed, the greater wood muſt be ſhaved ſmall, or cut for the tan engine, and the ſmaller bruiſed, or cut ſmall by the engine, after which it muſt be dried on a kiln, &c. See the article TANNING ENGINE.

For the uſe of tan in gardening, ſee the article STOVES.

TANACETUM, in botany, a genus of the *ſyngeneſia-polygamia æqualis* claſs of plants, with a compound, tubuloſe and convex flower, the leſſer corollulæ of which are funnel-faſhioned, and quinquifid at the limb: a ſingle ſeed ſucceeds each leſſer flower, and is contained in the cup. See plate CCLXVIII. fig. 3.

This genus comprehends the common tanzy,

Fig. 1. TAGETES.

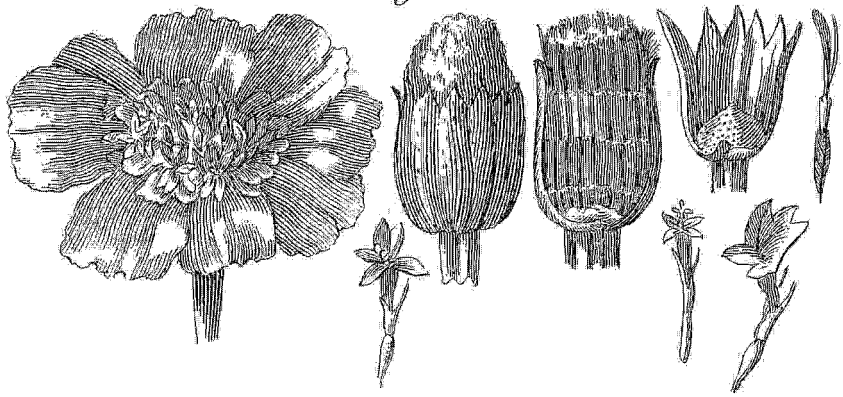


Fig. 2. TANGENT

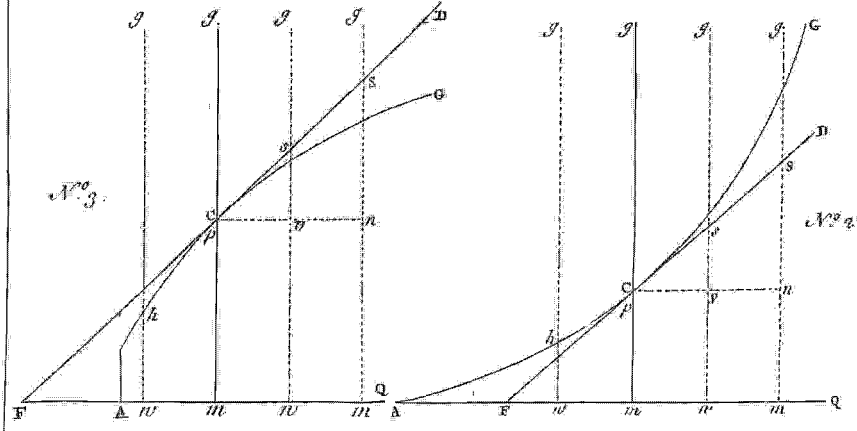


Fig. 3. TANACETUM the TANZY.

tanzy, coſtmary, &c. Tanzy, conſidered as a medicine, is a moderately warm bitter, and is much extolled by ſome in hyſteric complaints, eſpecially if proceeding from a deficiency or ſuppreſſion of the uterine purgations: its ſeeds and leaves have been in conſiderable eſteem as anthelmintics; and are ſaid to be good in colics and flatulencies.

TANAIS, or DON RIVER. See DON.

TANARO, a river of Italy, which riſing in the ſouth of Piedmont, runs north-eaſt by Aſti and Alexandria, and falls into the Po below Valenza.

TANASSERIM, a city of the farther India, and capital of a province of the ſame name, in the kingdom of Siam. eaſt long. 98°, north lat. 12°

TANCOS, a town of Eſtremadura, in Portugal, ſituated on the river Tagus, ſixty miles north-eaſt of Liſbon.

TANDA, a town ſituated on the eaſt ſide of the Ganges, in the province of Bengal: eaſt long. 87°, north lat. 25°.

TANDAYA, one of the moſt eaſterly of of the Philippine iſlands, ſituated in eaſt long. 124°, and north lat. 12°, ſubject to the king of Spain.

TANGENT, in geometry, is defined, in general, to be a right-line, E T (plate CCLXVIII. fig. 2. n° 1.) which touches any arch of a curve, H E in E, in ſuch a manner that no right-line can be drawn through E betwixt the right-line E T and the arch E H, or within the angle H E T that is formed by them.

The tangent of an arch is a right-line drawn perpendicularly from the end of a diameter, paſſing to one extremity of the arch, and terminated by a right-line drawn from the center through the other end of the arch, and called the ſecant. See SECANT and SINE.

And the co-tangent of an arch, is the tangent of the complement of that arch. See the articles ARCH and COMPLEMENT.

The tangent of a curve is a right-line which only touches the curve in one point, but does not cut it.

In order to illuſtrate the method of drawing tangents to curves, let A C G (*ibid.* n° 2.) be a curve of any kind, and C the given point from whence the tangent is to be drawn. Then conceive a right-line, *mg*, to be carried along uniformly, parallel to itſelf, from A towards Q; and let, at the ſame time, a point *p* ſo move in that line, as to deſcribe the given curve A C G: alſo let *mm*, or C*n*, expreſs the fluxion of A*m*, or the velocity wherewith the line *mg* is carried; and let *n* S expreſs the correſponding fluxion of *mp*, in the poſition *m* C*g*, or the velocity of the point *p*, in the line *mg*: moreover, through the point C let the right-line S F be drawn, meeting the axis of the curve, A Q, in F.

Now it is evident, if the motion of *p*, along the line *mg*, was to become equable at C, the point *p* would be at S, when the line itſelf had got into the poſition *m* S *g*; becauſe, by the hypotheſis, C*n* and *n* S expreſſes the diſtances that might be deſcribed by the two uniform motions in the ſame time. And if *w s g* be aſſumed to repreſent any other poſition of that line, and *s* the contemporary poſition of the point *p*, ſtill ſuppoſing an equable velocity of *p*; then the diſtances C*w*, and *ws*, gone over in the ſame time by the two motions, will always be to each other as the velocities, or as C*n* to *n* S. Therefore, ſince C*w* : *w s* :: C*n* : *n* S (which is a known property of ſimilar triangles) the point *s* will always fall in the right-line F C S: *ib.* n° 3. whence it appears, that if the motion of the point *p* along the line *mg* was to become uniform at C, that point would then move in the right-line C S, inſtead of the curve-line C G. Now, ſeeing the motion of *p*, in the deſcription of curves, muſt either be an accelerated or retarded one; let it be firſt conſidered as an accelerated one, in which caſe the arch C G will fall wholly above the right-line C D, as in n°. 2. becauſe the diſtance of the point *p* from the axis A Q, at the end of any given time, is greater than it would be if the acceleration was to ceaſe at C; and if the acceleration had ceaſed at C, the point *p* would have been always found in the ſaid right-line F S. But if the motion of the point *p* be a retarded one, it will appear, by arguing in the ſame manner, that the arch C G will fall wholly below the right-line C D, as in n°. 3.

This being the caſe, let the line *mg*, and the point *p*, along that line, be now ſuppoſed to move back again, towards A and *m*, in the ſame manner they proceeded from thence: then, ſince the velocity of *p* (*ibid.* n° 2.) did before increaſe, it muſt now, on the contrary, decreaſe; and therefore as *p*, at the end of a given time, after repaſſing the point

C, is not ſo near to AQ, as it would have been had the velocity continued the ſame as at C, the arch C*h* (as well as CG) muſt fall wholly above the right-line FCD: and by the ſame method of arguing, the arch C*h*, in the ſecond caſe, will fall wholly below FCD. Therefore FCD, in both caſes, is a tangent to the curve at the point C; whence the triangles F*m*C and C*n*S being ſimilar, it appears that the ſub-tangent *m*F is always a fourth proportional to *n*S the fluxion of the ordinate C*n*, the fluxion of the abſciſs, and C*m* the ordinate; that is, $Sn : nC :: mC : mF$. Hence, if the abſciſs $Am = x$, and the ordinate $mp = y$, we ſhall have $mF = \frac{y\dot{x}}{\dot{y}}$; by means of which general expreſſion, and the equation expreſſing the relation between x and y, the ratio of the fluxions $\dot{x}$ and $\dot{y}$ will be found, and from thence the length of the ſubtangent *m*F, as in the following examples.

Example I. To draw a right-line CT (*ibid.* n° 4.) a tangent to a given circle BCA, in a given point C. Let CS be perpendicular to the diameter AB, and put $AB = a$, $BS = x$, and $SC = y$. Then by the property of the circle, y^2 $(= CS^2) = BS \times AS\ (= x \times a - x) = ax - x^2$; whereof the fluxion being taken, in order to determine the ratio of $\dot{x}$ and $\dot{y}$, we get $2y\dot{y} = a\dot{x} - 2x\dot{x}$; conſequently $\frac{\dot{x}}{\dot{y}} = \frac{2y}{a-2x} = \frac{y}{\frac{1}{2}a-x}$; which, multiplied by y, gives $\frac{y\dot{x}}{\dot{y}} = \frac{y^2}{\frac{1}{2}a-x} =$ the ſubtangent ST. Whence, O being ſuppoſed the center, we have $OS\ (= \frac{1}{2}a - x) : CS\ (= y) :: CS\ (= y) : ST$; which is alſo found to be the caſe from other principles. See the article CIRCLE.

Example II. To draw a tangent to any given point C (*ibid.* n° 5.) of the conical parabola ACG. If the latus rectum of the curve be denoted by a, the ordinate MC by y, and its correſponding abſciſs AM by x; then the known equation, expreſſing the relation of x and y, being $ax = y^2$, we have, in this caſe, the fluxion $a\dot{x} = 2y\dot{y}$; whence $\frac{\dot{x}}{\dot{y}} = \frac{2y}{a}$, and conſequently $\frac{y\dot{x}}{\dot{y}} = \frac{2y^2}{a} = \frac{2ax}{a}, = 2x = MF$. Therefore the ſubtangent is juſt the double of its correſponding abſciſs AM. And ſo for finding the tangents of other ſpecies of curves. See CURVE, PARABOLA, ELLIPSIS, *&c.*

TANGERE, or NOLI ME TANGERE. See the article NOLI.

TANGERMUNDE, a town of Germany, in the circle of Upper Saxony, and marquiſate of Brandenburg, ſituated on the river Elbe, fifty-four miles weſt of Berlin.

TANGIER, a port-town of Africa, in the empire of Morocco and kingdom of Fez, ſituated at the entrance of the ſtraits of Gibraltar, in weſt long. 7°, north lat. 35° 40′. It was the capital of the antient Mauritania Tingitana, and was once in the poſſeſſion of the Engliſh.

TANGUT, a province of chineſian Tartary, ſituated north-weſt of the great wall which divides Tartary from China.

TANJOUR, a city of the hither India, capital of a province of the ſame name, ſituated eaſt long. 79°, north lat. 11° 30′.

TANNER, one who dreſſes hides, *&c.* by tanning them. See the next article.

TANNING, the preparing of ſkins or hides in a pit, with tan and water, after the hair has been firſt taken off, by putting the ſkins into lime-water. See the articles SKIN, HIDE, *&c.*

Method of TANNING *oxen-hides.* The ſkin being flayed off the carcaſe, if it is intended to be kept, is ſalted with ſea-ſalt and alum, or with a coarſe kind of ſalt-petre. If it is not for keeping, the ſalting is ſaved, as being of no uſe but to prevent the hide from corrupting before it can be conveniently carried to the tan-houſe. Whether the hide have been ſalted or not, the tanner begins with taking off the horns, the ears, and the tail, after which it is thrown into a running water for about thirty hours, to waſh off the blood and other impurities adhering to the inſide. This done, it is laid over night in a lime-pit, already uſed, whence it is taken and left to drain three or four days on the edge of the pit. The firſt and ſlighteſt preparation over, it is retained into a ſtrong lime-pit for two days, then taken out for four days more; and thus for ſix weeks alternately, it is taken out and put in twice a week. At the ſix weeks end it is put into a freſh pit, where it continues eight days, and is then taken out for ſo many, and thus alternately for a year or eighteen months, according to the ſtrength of the leather and the weather; for in great heats they put in freſh lime twice a week; and in froſt they

they ſometimes do not touch them for three months. Every freſh lime-pit they throw them into, is ſtronger and ſtronger. At the end of four, five, or ſix weeks, the tanner ſcrapes off the hair on a wooden leg or horſe, with a kind of knife made for that purpoſe. And after a year or eighteen months, when the hair is perfectly gone, he carries it to a river to waſh, pares off the fleſh on the leg with a kind of cutting-knife, and rubs it briſkly with a ſort of whetſtone, to take off any remains of fleſh or of filth on the ſide of the hair. The ſkin is now put into tan, that is, it is covered with tan as it is ſtretched in the pit, and water is let in upon it; if the ſkin is ſtrong, five coverings of tan will be required; for weaker, three or four may ſuffice. When the ſkin has not been kept long enough in lime, or in the tan-pit, upon cutting it in the middle there appears a whitiſh ſtreak, called the horn or crudity of the ſkin, and it is this crudity that is the reaſon why the ſoles of ſhoes, boots, &c. ſtretch ſo eaſily and take water. When the hides are ſufficiently tanned, they are taken out of the pit to be dried, by hanging them in the air; then the tan is cleared off them, and they are put into a place neither too dry nor too moiſt; they are there well ſtretched over one another with weights a-top, to keep them tight and ſtrait; and in this condition are ſold under the denomination of bend-leather. This is the method of tanning bullocks or oxen-hides. Cows, calves, and horſes ſkins are tanned much after the ſame manner of thoſe of oxen, except that they are only kept four months in the lime-pit, and that before they be put in the tan, there is a preparation required thus: cold water is poured into a wooden vat, or tub, wherein the ſkins are put, which are kept ſtirring while ſome other water is warming in a kettle; and as ſoon as that water is little more than luke-warm, it is poured gently into the vat, and upon this is caſt a baſket of tan; during which time the ſkins are ſtill kept turning, that the water and tan may not ſcorch them. After an hour they are taken out and caſt for a day into cold water, then returned to the former vat and the ſame water they had been in before, and here they are left for eight days: which expired, they are put into the tan-pit, and three coverings of tan given them; the firſt of which laſts five weeks, the ſecond ſix, and the third two months. The reſt of the proceſs is the ſame in all reſpects as that delivered above. See TAN, LEATHER, and the next article.

TANNING ENGINES, machines uſed by tanners for beating, cutting, and grinding tan, or the materials uſed in tanning. See TAN, and the preceding article.

The machine for cutting tan, as repreſented in plate CCLXIX. fig. 1. n° 1, 2. conſiſts of a long ſquare wooden block, which is beſt of oak or elm; and of ſome pieces of iron to be faſtened on it, and uſed about it, *viz.* an anvil, a hammer, an iron holding the wood to be bruiſed and cut, and a knife. AB, n° 1. is the length of the block, being about four feet; CD the breadth, which is fifteen or ſixteen inches; EF the depth, eight or ten inches; GHIK a ſquare cavity to receive a plate of iron, ſerving for an anvil to beat and bruiſe the tanning materials upon; this is to be about four inches deep, nine inches broad, and twelve inches long; LMNO the iron for claſping and holding faſt the materials to be bruiſed and cut, which muſt lie croſs the engine, about the middle of the ſaid piece of timber, and may be about three inches broad; PQ are two hooks at one end of it, which are turned upwards, and muſt be hooked into the loops of the two hinges that are let in and faſtened to the ſides of the engine RS, in ſuch a manner that this claſping-piece may be a little raiſed for putting the tanning materials under it. At the ſide T, (*ibid.* n° 2.) is a ſingle hook turned alſo upwards, to hang a weight upon it, whilſt the ſtuff is a bruiſing by the anvil, or a cutting by the knife. The button in n° 1. ſerves to take up this piece by; *aaaa* on the other ſide of the block, n° 2. are the places for the four feet of the engine, which are to be of a convenient height to work upon it. *b* (*ibid.* n° 3.) is the hammer for beating and bruiſing the ſtuff, which may be of ſix pounds weight, and the head about three inches ſquare, to work with both hands; but for one hand, it may be made of three pounds weight, and the head about two inches ſquare: the ſurface of one end of theſe hammers ſhould be ſmooth, but that of the other indented. *cd*, n° 1. the knife for cutting the bruiſed ſtuff, which muſt be eight or nine inches long, and near as much in breadth, made like a tobacco-knife, with a handle, and faſtened to the block at the two oppoſite ſides, that are to be hollowed, with two grooves, *efgh*, n° 2. and *iklm*, n° 1. with

with two pieces of iron fitted in the grooves, to hold and guide the knife in cutting. *nopq*, n° 1. is to be faſtened to the end of the knife *c*, by a pin *r*, paſſing through three holes; and this end is to be ſcrewed into the groove *efgh*, n° 2. by a couple of ſcrew-pins; the other piece, *ſtuxyz*, n° 1. being forked in, is to receive the other end of the knife *d*, and the ſolid ſquare part thereof, IKLM, is to be faſtened in the groove under it by two iron-plates *aa ee*, under which it muſt run in the ſaid groove ſo as to be ſlipped out from under it, and laid by when the machine is not uſed, when alſo the piece at the other end may be unſcrewed and laid up. The long ſquares upon one end of the block, *viz.* 5, 6, 7, 8, n° 1. are two iron plates, to be faſtened where the knife, moving in a fit cavity, is to cut the bruiſed ſtuff between them; and of theſe plates that which lies next the end is to be laid a little lower, the block being there pared accordingly, that ſo the ſtuff may fall off from the end of the machine the quicker, as the left-hand ſupplies the bruiſed materials, whilſt the right-hand cuts them. Let the hollow place where the knife cuts be as near as poſſible, only large enough for the knife to riſe and fall eaſily; and let the block be hollowed under the cutting-hole, and ſloped off at that end, for the ſtuff to fall off, as it is cut by the knife.

The ſtuff being cut ſmall by the engine, is to be well dried again on a kiln, and then ground into a coarſe powder upon the mill, being a large round wooden trough, with a pretty large ſtone ſet on edge in it, and turned round by a horſe, as repreſented *ibid.* n° 4.

TANT, or the LITTLE SCARLET-SPIDER, in the hiſtory of inſects, the red land acarus, with a depreſſed body. See the article ACARUS.

This is a ſmall ſpecies, its body is roundiſh but a little approaching to oval; the back ſomewhat depreſſed; it is of a fine ſcarlet colour, and covered with a velvety down.

TANTALUS's CUP, in hydraulics, a ſiphon ſo adapted to a cup, that the ſhort leg being in the cup, the long leg may go down through the bottom of the cup. See the article SIPHON.

This bended ſiphon is called Tantalus's cup, from the reſemblance of the experiment made with an image in the glaſs, repreſenting Tantalus in the fable, fixed up in the middle of the cup with a ſiphon concealed in his body, beginning in the bottom of his feet, and aſcending to the upper part of his breaſt; there it makes a turn, and deſcends through the other leg, on which he ſtands; and from thence down through the bottom of the cup, where it runs out, and cauſes the water to ſubſide in the cup: as ſoon as it riſes to the height of the ſiphon, or to the chin of the image, which is above S *s*, plate CCLXIX. fig. 2. n° 1. the water will begin to run through the ſiphon concealed in the figure, till the cup is emptied in the manner explained under ſiphon, and repreſented more diſtinctly in *ibid.* n° 2.

Sometimes the Tantalus's cup is made without a figure fixed in it, as *ibid.* n° 3. where the water being up at S *s*, the cup does not run; but as ſoon as the figure, or an apple, or orange, *&c.* is thrown in, the water begins to run out at the foot of the cup, and does not ceaſe till the whole cup is empty. This happens becauſe the body thrown into the cup, raiſes the water's ſurface from S *s* to B C, where being above the upper end S of the pipe S P concealed in the handle, which thereby is made a ſiphon, the water, which is come into the handle at O, runs into the middle pipe at *s*, and ſo out at P, under the foot, ſo long as there is any water above O.

TANTAMOUNT, ſomething that amounts, or is equivalent, to ſome other.

TANTUM DECIES. See the article DECIES TANTUM.

TANZY, *tanacetum*, in botany. See the article TANACETUM.

TAORMINA, a port-town of Sicily, ſituated in the province of Demona, eighteen miles ſouth of Meſſina.

TAP, among hunters, an hare is ſaid to tap or beat, when ſhe makes a particular noiſe at rutting-time.

TAP-ROOT, among gardiners, that part of the root that deſcends ſtraight down.

TAPASSANT, among hunters, denotes lurking or ſquatting.

TAPE-WORM, in the hiſtory of inſects, the flat tænia, frequently growing to the length of ſeveral ells. See TÆNIA.

This creature is found in the human inteſtines, and in thoſe of many other animals, as well fiſh as quadrupeds.

TAPER, TAPERING, is underſtood of a piece of timber, or the like, when broad at one end and gradually diminiſhing to the other, as is the caſe in pyramids, cones, *&c.*

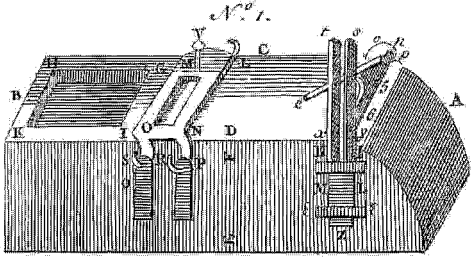
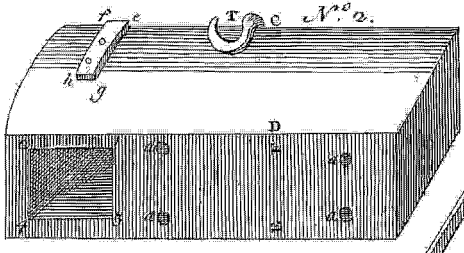
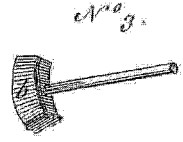


Fig. 1. TANNING-ENGINE and MILL.





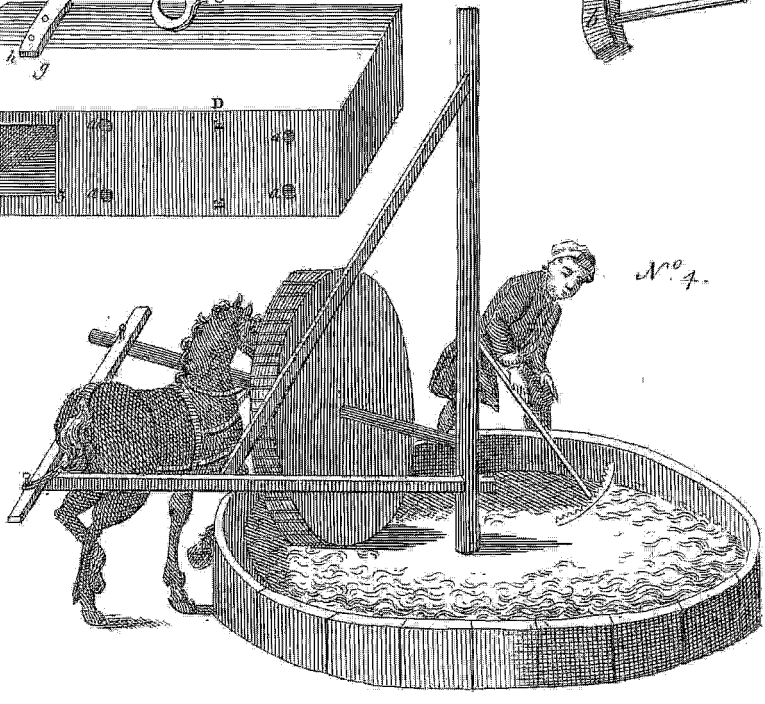
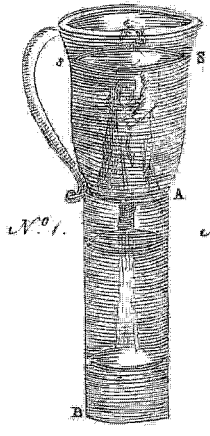
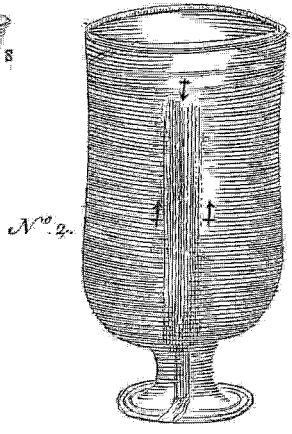


Fig. 2. TANTALUS's CUP





J. Jefferys sculp.

TAPER BORED, is applied to a piece of ordnance when it is wider at the mouth than towards the breech.

TAPER alſo denotes a kind of tall wax-candle placed in a candleſtic, and burnt at funeral proceſſions, and in other church-ſolemnities. Tapers are made of different ſizes; in ſome places, as Italy, *&c.* they are cylindrical, but in moſt other countries, as England, France, *&c.* they are conical or taper; both kinds are pierced at the bottom for a kind of pin in the candleſtic to enter. For the method of making tapers, both by the ladle and by the hand, ſee the articles CANDLE and FLAMBEAU.

Paſchal TAPER, among the romaniſts, a large taper whereon the deacon applies five bits of frankincenſe in holes made for the purpoſe in form of a croſs, and which he lights with new fire in the ceremony of Eaſter-Sunday.

TAPESTRY, or TAPISTRY, a curious kind of manufacture, ſerving to adorn a chamber or other apartment, by covering or lining the walls thereof. It is a kind of woven hangings of wool and ſilk, frequently raiſed and inriched with gold and ſilver, repreſenting figures of men, animals, landſkips, hiſtories, *&c.*

The invention of tapeſtry ſeems to have come to us from the Levant; and this ſeems the more probable, in that the workmen concerned in it were called, at leaſt in France, ſarraſins, or ſorraſinois. It is ſuppoſed that the Engliſh and Flemiſh, who were the firſt that excelled in making tapeſtery, might bring the art with them from ſome of the Croiſades, or expeditions againſt the Saracens. Be this as it will, it is certain that theſe two nations, eſpecially the Engliſh, were the firſt who ſet on foot this noble and rich manufacture in Europe, now one of the fineſt ornaments of palaces, churches, *&c.* and therefore if they may not be allowed the inventors, they have at leaſt the glory of being the reſtorers of this ſo curious and admirable an art, as gives a kind of life to wools and ſilks, in no reſpect inferior to the paintings of the beſt maſters.

Tapeſtry-work is diſtinguiſhed by the workmen into two kinds, *viz.* that of high, and that of low warp; though the difference is rather in the manner of working than in the work itſelf; which is in effect the ſame in both; only the looms, and conſequently the warps, are differently ſituated. Thoſe of the low warp being placed flat and parallel to the horizon, and thoſe, on the contrary, of the high warp erected perpendicularly. The Engliſh antiently excelled all the world in the tapeſtry of the high warp, and they ſtill retain their former reputation, though with ſome little change: their low warps are ſtill admired; but, as for the high ones, they are quite laid aſide by the French. The French have three conſiderable tapeſtry-manufactures beſides that of the Gobelins; the firſt at Aubuſſon in Auvergne, the ſecond is at Felletin in the Upper Marche, and the third at Beauvais. They were all equally eſtabliſhed for the high and the low warp; but they have all laid aſide the high warp, excepting the Gobelins. There are admirable low warps in Flanders, generally exceeding thoſe of France; the chief and almoſt only Flemiſh manufactures are at Bruſſels, Antwerp, Oudenard, Liſle, Tournay, Bruges, and Valenciennes.

The uſual widths of tapeſtries are from two ells to three ells Paris-meaſure.

The manufacture of TAPESTRY *of the high warp.* The loom, whereon it is wrought, is placed perpendicularly: it conſiſts of four principal pieces; two long planks or cheeks of wood, and two thick rollers or beams. The planks are ſet upright, and the beams acroſs them, one at the top, and the other at the bottom, or about a foot diſtance from the ground. They have each their trunnions, by which they are ſuſpended on the planks, and are turned with bars. In each roller is a groove from one end to the other, capable of containing a long round piece of wood, faſtened therein with hooks. The uſe of it is to tie the ends of the warp to. The warp, which is a kind of worſted, or twiſted woollen thread, is wound on the upper roller; and the work, as faſt as wove, is wound on the lower. Within-ſide the planks, which are ſeven or eight feet high, fourteen or fifteen inches broad, and three or four thick, are holes pierced from top to bottom, in which are put thick pieces of iron, with hooks at one end, ſerving to ſuſtain the coat-ſtave: theſe pieces of iron have alſo holes pierced, by putting a pin in which, the ſtave is drawn nearer or ſet further off; and thus the coats or threads are ſtretched or looſened at pleaſure. The coat-ſtave is about three inches diameter, and runs all the length of the loom; on this are fixed the coats or threads, which make the threads of the warp croſs each other. It

has much the ſame effect here, as the ſpring-ſtave and treddles have in the common looms. The coats are little threads faſtened to each thread of the warp with a kind of ſliding knot, which forms a ſort of maſh or ring. They ſerve to keep the warp open for the paſſage of broaches wound with ſilks, woollens, or other matters uſed in the piece of tapeſtry. In the laſt place, there are a number of little ſticks of different lengths, but all about an inch in diameter, which the workman keeps by him in baſkets, to ſerve to make the threads of the warp croſs each other, by paſſing them acroſs: and, that the threads thus croſſed may retain their proper ſituation, a packthread is run among the threads, above the ſtick.

The loom being thus formed, and mounted with its warp, the firſt thing the workman does, is to draw on the threads of this warp, the principal lines and ſtrokes of the deſign to be repreſented on the piece of tapeſtry; which is done by applying cartoons, made from the painting he intends to copy, to the ſide that is to be the wrong ſide of the piece, and then, with a black-lead pencil, following and tracing out the contours thereof on the thread of the right ſide; ſo that the ſtrokes appear equally both before and behind.

As for the original deſign the work is to be finiſhed by, it is hung up behind the workmen, and wound on a long ſtaff from which a piece is unrolled from time to time, as the work proceeds.

Beſides the loom, &c. here deſcribed, there are three other principal inſtruments required for working the ſilk or the wool of the woof within the threads of the warp; theſe are a broach, a reed, and an iron-needle.

The broach is made of a hard wood, ſeven or eight inches long, and two thirds of an inch thick, ending in a point with a little handle. This ſerves as a ſhuttle; the ſilks, woollens, gold, or ſilver to be uſed in the work, being wound on it.

The reed or comb is alſo of wood, eight or nine inches long, and an inch thick on the back, whence it grows leſs and leſs to the extremity of the teeth, which are more or leſs apart, according to the greater or leſs degree of fineneſs of the intended work. Laſtly, the needle is made in form of the common needle, only bigger and longer. Its uſe is to preſs cloſe the wool and ſilks when there is any line or colour that does not ſit well.

All things being prepared for the work, and the workman ready to begin, he places himſelf on the wrong ſide of the piece, with his back towards the deſign; ſo that he works as it were blind-fold, ſeeing nothing of what he does, and being obliged to quit his poſt, and go to the other ſide of the loom, whenever he would view and examine the piece, to correct it with his preſſing-needle. To put ſilk, &c. in the warp, he firſt turns and looks at the deſign, then, taking a broach full of the proper colour, he places it among the threads of the warp, which he brings croſs each other with his fingers, by means of the coats or threads, faſtened to the ſtaff; this he repeats every time he is to change his colour. Having placed the ſilk or wool, he beats it with his reed or comb; and when he has thus wrought in ſeveral rows over each other, he goes to ſee the effects they have, in order to reform the contours with his needle, if there be occaſion. As the work advances, it is rolled upon the lower beam, and they unrol as much warp from the upper beam, as ſuffices them to continue the piece: the like they do of the deſign behind them. When the pieces are wide, ſeveral workmen may be employed at once.

We have but two things to add: the firſt is, that the high-warp tapeſtry goes on much more ſlowly than the low-warp, and takes up almoſt twice the time and trouble. The ſecond is, that all the difference that the eye can perceive between the two kinds, conſiſts in this, that in the low-warp there is a red fillet, about one twelfth of an inch broad, running on each ſide from top to bottom, which is wanting in the high-warp.

But, for the ſatisfaction of our readers, we ſhall here preſent them with a repreſentation of the loom for the manufacture of tapeſtry of the high-warp, or that in a ſituation perpendicular to the horizon. See plate CCLXX. fig. 1. where 1, 1, repreſent the loom-poſts, or the thick planks, which ſupport the rollers. 2, The rollers; the upper end holds the chain, the lower holds the tapeſtry, which is rolled upon it, according as the work goes forward: the threads are faſtened at their ends to a dweet, or thick rod, which is lodged in a groove made on each roller. 3, The two tantoes; one called the great tantoe, for turning the upper roller; the other the little tantoe, for turning the lower roller. 4, The pole of the leiſhes, which runs quite a-croſs the chain, takes

TAPESTRY-WEAVING.

Fig. 1. TAPESTRY-LOOM for the high warp, or that in a perpendicular Situation

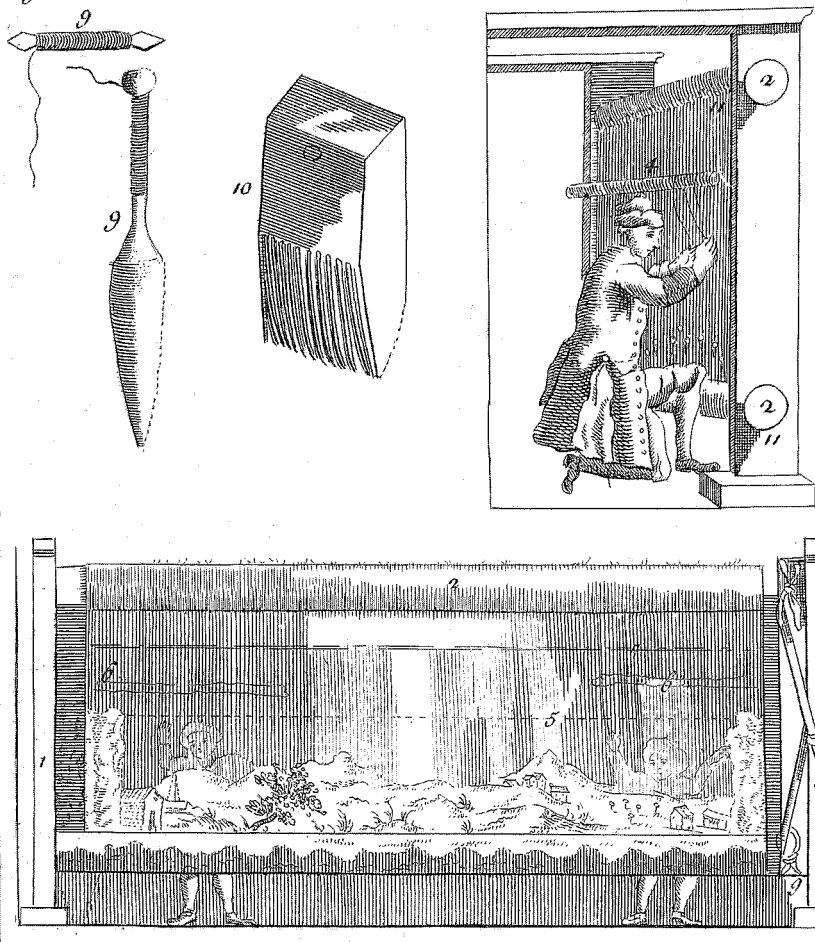
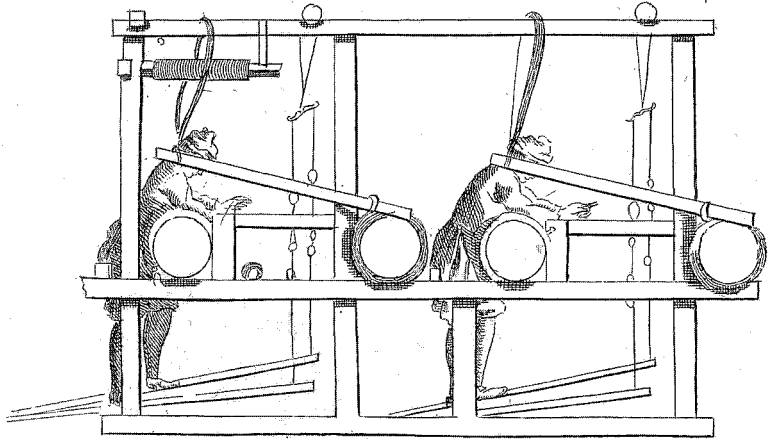


Fig. 2. TAPESTRY-LOOM for the low Warp, or that in an horizontal Situation



J. Jefferys sculp.

takes up all the leiſhes, and brings them to the workman's hand. Theſe leiſhes are little ſtrings, tied by a ſlip-knot to each thread of the chain, to be raiſed up according as the chain ſinks down: they ſerve to draw the particular thread which the weaver wants: he holds the thread ſeparate from the reſt, and paſſes a ſpindle of ſuch a woof and colour as he thinks proper; then he lets the ſpindle hang down, and hinders the thread from running off, by a ſlip-knot. After having taken one or two threads of the fore-part of the chain by another leiſh, he brings the threads of the oppoſite ſide to him. By this alternative work he conſtantly makes them croſs one another, to take in and ſecure the woof. In order to diſtinguiſh the threads of both ſides, he is aſſiſted by the croſs rod, which is put between two rows of threads. 5, A long tract of dots formed by the ends of the leiſhes, which take hold of the leiſhes of the chain by a ſlip-knot; and on the other hand encompaſs the pole of the leiſhes. 6, The croſs rod. 7, A little chain, each loop of which contains four or five threads of the warp, and keeps them perpendicular. 8, An iron-hook, to ſupport the pole of the leiſhes. 9, 9, 9, The broacher-quill, to paſs the threads of the woof, which is wound on it. 10, The comb, to ſtrike in the work. 11, The end of the dweet let into the roller, in a groove.

When the chain is mounted, the draughtſman traces the principal out-lines of the picture, which is to be wrought, with black chalk on the fore and back ſide of the chain. The weaver in the upright way having prepared a good ſtock of quills, filled with threads of all colours, goes to work, placed on the back part, as in the flat way, or in the manufacture of the low-warp. He has behind him his drawings, on which he frequently looks, that he may from time to time ſee how his work ſucceeds on the right or fore ſide, which the other cannot do.

The manufacture of TAPESTRY *of the low-warp.* The loom or frame wherein the low-warp is wrought, is much like that of the weavers; the principal parts thereof (*ibid.* fig. 2.) are two ſtrong pieces of wood, forming the ſides of the loom, and bearing a beam or roller at each end; they are ſuſtained at bottom with other long pieces of wood, in manner of treſſels: and, to keep them the firmer, are likewiſe faſtened to the floor, with a kind of buttreſſes, which prevent any ſhaking, though there are ſometimes four or five workmen leaning on the beam at once. The rollers have each their trunnions, by which they are ſuſtained; they are turned by large iron-pins, three feet long. Along each beam runs a groove, in which is placed the wich, a piece of wood above two inches diameter, and almoſt the length of the roller. This piece fills the groove intirely, and is faſtened therein, from ſpace to ſpace, by wooden-pins. To the two wiches are faſtened the two extremities of the warp, which is wound on the further roller, and the work, as it advances, on the nearer. Acroſs the two ſides, almoſt in the middle of the loom, paſſes a wooden bar, which ſuſtains little pieces of wood, not unlike the beam of a ballance: to theſe pieces are faſtened ſtrings, which bear certain ſpring-ſtaves, wherewith the workman, by means of two treddles under the loom, on which he ſets his feet, gives a motion to the coats, and makes the threads of the warp riſe and fall alternately. Each loom has more or fewer of theſe ſpring-ſtaves, and each ſtaff more or fewer coats, as the tapeſtry conſiſts of more or fewer threads. The deſign or painting the tapeſtry-man is to follow, is placed underneath the warp, where it is ſuſtained from ſpace to ſpace with ſtrings, by which the deſign is brought nearer to the warp. The loom being mounted, there are two inſtruments uſed in working of it, *viz.* the reed and the flute.

The flute does the office of the weaver's ſhuttle: it is made of a hard poliſhed wood, three or four lines thick at the ends, and ſomewhat more in the middle, and three or four inches long. On it are wound the ſilks, or other matters, to be uſed as the woof of the tapeſtry, repreſented.

The comb, or reed, is of wood or ivory: it has uſually teeth on both ſides; it is about an inch thick in the middle, but diminiſhes each way to the extremity of the teeth; this ſerves to beat the threads of the woof cloſe to each other, as faſt as the workman has paſſed and placed them, with his flute, among the threads of the warp, as repreſented at 10. fig. 1.

The workman is ſeated on a bench before the loom, with his breaſt againſt the beam, only a cuſhion or pillow between them; and in this poſture ſeparating with his fingers the threads of the warp, that

he may see the design underneath; and taking a flute, wound with the proper colour he fastens it among the threads, after having raised or lowered them, by means of the treddles, moving the spring-staves and coats.

Lastly, to press and close the threads of the silk or yarn, &c. thus placed, he strikes each course (*i. e.* what the flute leaves in its passing and coming back again) with the reed.

That which is very remarkable in the manufacture of the low-warp, and which is common to it with the high, is, that it is all wrought on the wrong side; so that the workman cannot see the right side of his tapestry, until the piece is finished, and taken out of the loom.

TAPIA, in botany, same with the crateva. See the article CRATEVA.

TAPPING, in general, the act of piercing an hole in a vessel, and applying a tube or cannula in the aperture, for the commodious drawing off the liquors contained therein.

TAPPING, in agriculture, is the making an incision in the bark of a tree, and letting out the juice. To tap a tree at the root, is to open it round about the root. In the tapping of trees, the juice, taken in from the earth, ascends from the root; and, after it is concocted and assimilated, in the branches, &c. it descends, like a liquor in an alembic, to the orifice or incision, where it issues out. One of the most effectual ways of tapping, so as to obtain the greatest quantity of sap, and that in the shortest time, is not only to pierce the bark, or to cut the body of the tree almost to the pith with a chissel (as some have directed), but to bore through all the circles on both sides the pith, leaving only the outermost circle and the bark on the north-east side unpierced. This hole is to be bored sloping upwards, as large as the largest augre will make; and that also through and under a large arm near the ground; and thus it will not need any stone to keep open the orifice, nor tap to direct the sap into the receiver. This way the tree will, in a short time, afford liquor enough to brew withal: and with some of this sweet sap, one bushel of malt is said to make as good ale as four bushels of malt with ordinary water. The large maple, called the sycamore, is said to yield the best brewing sap, its juice being very sweet and wholesome. It is affirmed that the liquor which may be drawn from a birch, in the spring-time, is equal to the whole weight of the tree, branches, root, and all together.

To preserve the sap for brewing, insolate it by a constant exposure to the sun, in proper vessels, till the rest be gathered and ready, otherwise it will contract an acidity. When there is enough, put into it as much very thin-cut and hard-toasted rye-bread, as will serve to ferment it; and when it works, take out the bread, and bottle up the liquor. A few cloves in each vessel that receives the sap, as it ooses from the tree, will also preserve it a twelvemonth.

TAPPING, in surgery. See the article PARACENTESIS.

TAPTE, a river of the hither India, which runs from east to west, through the province of Cambaya, and falls into the indian ocean, a little below Surat.

TAP-TO. See the article TAT-TO.

TAPUYERS and TAPINAMBES, two numerous tribes which the Portuguese found in Brasil, in south America, when they planted that country.

TAR, a thick, black, unctuous substance, obtained from old pines and fir-trees, by burning them with a close smothering heat: for the method of obtaining which, and the use of it in coating and caulking ships, &c. see the article PITCH.

With regard to the medical uses of tar, it may be observed, that it differs from the native resinous juice of trees, in having received a disagreeable impression from the fire, and containing a portion of the saline and other juices, united with the resinous and oily; by the mediation of these, a part of the terebinthinate oil proves dissoluble in aqueous liquors, which extract little or nothing from the purer turpentines. See TURPENTINE.

Water impregnated with the more soluble parts of tar, proves, in consequence of this hot pungent oil, warm and stimulating: it sensibly raises the pulse, and quickens the circulation. By these qualities, in cold, languid, phlegmatic habits, it strengthens the solids, attenuates viscid juices, opens obstructions of the minuter vessels, and promotes perspiration and the fluid secretions in general; whilst in hot bilious temperaments, it disposes to inflammation, and aggravates the complaints which it has been employed to remove.

Tar-water has lately been recommended to the world as a certain and safe medicine in almost all diseases; a slow, yet effectual

effectual alterative in cachexies, ſcurvies, chlorotic, hyſterical, hypochondriacal, and other chronical complaints; and a ſudden remedy in acute diſtempers, which demand immediate relief, as pleuriſies, peripneumonies, the ſmall-pox, and all kinds of fevers in general. This medicine, though inferior to the character given of it, is, doubtleſs, in many caſes, of conſiderable utility. It ſenſibly raiſes the pulſe, and occaſions ſome conſiderable evacuations, generally by perſpiration or urine, though ſometimes by ſtool or vomit: hence it is ſuppoſed to act by increaſing the vis vitæ, and enabling nature to expel the morbific humours. We ſhall here inſert, from the firſt public recommender of this liquor, biſhop Berkley, ſome obſervations on the manner of uſing it. Tar-water, when right, is not paler than french, nor deeper than ſpaniſh white wine, and full as clear: if there be not a ſpirit very ſenſibly perceived in drinking, you may conclude the tar-water is not good. It may be drank either cold or warm; in colics, it is judged to be beſt warm. As to the quantity, in common chronical indiſpoſitions, a pint a day may ſuffice, taken on an empty ſtomach, at two or four times, to wit, night and morning, and about two hours after dinner and breakfaſt: more may be taken by ſtrong ſtomachs. But thoſe who labour under great and inveterate maladies, muſt drink a greater quantity, at leaſt a quart every twenty-four hours: all of this claſs muſt have patience and perſeverance in the uſe of this, as well as of all other medicines, which, though ſure, muſt yet, in the nature of things, be ſlow in the cure of inveterate and chronical diſorders. In acute caſes, and fevers of all kinds, it muſt be drank in bed, warm, and in great quantity (the fever ſtill enabling the patient to drink), perhaps a pint every hour; which has been known to work ſurpriſing cures. But it works ſo quick, and gives ſuch ſpirits, that the patients often think themſelves cured before the fever hath quite left them.

Ointment of tar is directed in the London Diſpenſatory to be made as follows: take of mutton-ſuet tried, and tar, each equal weights; melt them together, and ſtrain the mixture whilſt hot. This compoſition, with the addition of half its weight of reſin, has long been uſed in the ſhops, as a cheap ſubſtitute to the black baſilicon. See BASILICON.

Tar-pills are directed, in the Edinburgh Diſpenſatory, to be prepared as follows: take of tar any quantity at pleaſure, mix it with as much elecampane-root as will reduce it into a proper thickneſs for being formed into pills. The powder, here mixed with it, though of no great virtue, is, nevertheleſs, a very uſeful addition, not only for procuring it a due conſiſtence for taking, but likewiſe, as it divides the glutinous texture of the tar, and thus prevents its adhering to the inteſtines, and promotes its ſolubility in the animal juices. Each dram of the maſs is formed into twelve pills, ſix of which are taken every morning and evening, in diſorders of the breaſt, phthiſes, ſcurvies, &c. They are far more different in quality from tar-water, than might be at firſt expected; that nauſeous draught has little heat, pungency, and bitterneſs: the water extracting only a ſmall quantity of the hot oil, which becomes ſoluble by the mediation of the acid, produced in the preparation of the tar.

Some have imagined this acid to be the oily ſubſtance that gives virtue to tar-water; and hence have endeavoured to introduce an acid ſpirit, obtained from tar by diſtillation; but the effects of this, and all other acids, are directly contrary to thoſe experienced, either from tar-water, or tar given in ſubſtance.

Barbadoes tar is nearly of the conſiſtence of common tar, and of a reddiſh black colour and diſagreeable ſmell. This bitumen is found in ſeveral of our american iſlands, where it is eſteemed, by the inhabitants, of great ſervice as a ſudorific, and in diſorders of the breaſt and lungs; though in caſes of this kind, attended with inflammation, it is certainly improper. They alſo apply it externally as a diſcutient, for preventing paralytic diſorders. Among us it is rarely uſed, and not often to be met with genuine. The college employ it as a menſtruum for ſulphur, in the barbadoes balſam of ſulphur; and direct an oil to be diſtilled from it.

TARACON, a city of Spain, in the province of Arragon, ſituated on the confines of old Caſtile: weſt lon. 2° 6′, and north lat. 41° 55′.

TARAGON, a city and port-town of Spain, in the province of Catalonia, ſituated on the Mediterranean ſea, in eaſt long. 1° 15′, and north lat. 41° 6′.

TARANTISMUS, in medicine, the diſeaſe or affection of thoſe bit by the tarantula. See the article TARANTULA. The patients under this malady are denominated tarantati.

TARANTO, a port-town of Italy, in the kingdom of Naples, ſituated on the gulph of Otranto, forty-five miles weſt of that city, being the ſee of an archbiſhop.

TARANTULA, in the hiſtory of inſects, a ſpecies of aranea, with an oval hairy body and thick legs. See ARANEA.

This is one of the large ſpiders, but is not the very largeſt known: its body is three quarters of an inch long, and of the thickneſs of one's little finger: it is uſually of an olive brown, variegated with a duſkier colour; but in this it varies greatly: it is covered with a ſhort and ſoft down, or hairineſs; the points of its forceps are very fine and ſharp: this ſpecies is a native of Apulia.

As to the effects of the poiſon they convey into the wound they make, there ſeems yet room for much explanation about it. We are told, that in the ſummer months, eſpecially when the heats are greateſt, as in the dog-days, the tarantula, creeping among the corn in the fields, bites the mowers and paſſengers: that in the winter it lurks in holes, and is ſcarcely ſeen; and that if it bits then, it is not ſo venomous, neither does it induce any ill ſymptoms: but in hot weather, according to Dr. Mead, although the pain of its bite is at firſt no greater than what is cauſed by the ſting of a bee, yet the part is quickly after diſcoloured with a livid, black, or yellowiſh circle, and raiſed to an inflamed ſwelling; the patient within a few hours is ſeized with a violent ſickneſs, difficulty of breathing, univerſal faintneſs, and ſometimes trembling, with a weakneſs in the head; and on being aſked his ailment, with a tremulous voice, and melancholy look, points to his breaſt, as if the heart was moſt affected: the patient grows by degrees more melancholy, ſtupid, and ſtrangely timorous, and in a ſhort time expires, unleſs muſic is called to his aſſiſtance, which alone, without the help of medicines, is ſaid to perform the cure, the uſual alexipharmics and cordial medicines, being of no ſervice: for at the firſt ſound of the muſical inſtrument, although the ſick lie as it were in an apoplectic fit, they begin, by degrees, to move their hands and feet, till at laſt they get up, and fall to dancing, with wonderful vigour at firſt, for three or four hours; then they are put to bed, refreſhed from their ſweating a ſhort time, and repeat their exerciſe, with the ſame vehemence, perceiving no wearineſs or weakneſs from it, but profeſſing that they grow ſtronger and nimbler the more they dance. At this ſport they uſually ſpend twelve hours a day; and it continues three or four days, by which time they are freed from all their ſymptoms; which, nevertheleſs, attack them about the ſame time next year; and if they do not take care to prevent this relapſe by muſic, they fall into the jaundice, want of appetite, univerſal weakneſſes, and ſuch like diſeaſes, which are every year increaſed, if dancing be neglected, till at laſt they prove incurable. As muſic is the common cure, ſo they who are bitten are pleaſed, ſome with one ſort of it, and ſome with another; one is raiſed with a pipe, another with a timbrel, one with a harp, and another with a fiddle; ſo that the muſicians ſometimes make ſeveral eſſays before they can accommodate their art to the venom: but this is conſtant and certain, notwithſtanding this variety, that they all require the quickeſt and briſkeſt tunes; and are never moved by a ſlow dull harmony. While the tarantati are dancing, they loſe in a manner the uſe of all their ſenſes, are like ſo many drunkards, do many ridiculous and fooliſh tricks, talk and act obſcenely and rudely, take great pleaſure in playing with vine-leaves, with naked ſwords, red cloaths, and the like; and, on the other hand, cannot bear the ſight of any thing black, ſo that if any byſtander happen to appear in that colour, he muſt immediately withdraw, otherwiſe they relapſe into their ſymptoms with as much violence as ever. Baglivi, who reſided in Italy, and probably had good opportunities of informing himſelf with reſpect to this inſect, has written a treatiſe expreſly upon the ſubject: and moſt medicinal writers mention the diſtempers ariſing from the bite thereof, as a thing certain.

But, notwithſtanding all theſe great authorities, there is good reaſon to believe the whole ſtory fabulous, and a vulgar error; for it is treated as ſuch by an italian phyſician, in the Philoſ. Tranſact. and a great many gentlemen of unqueſtionable veracity, who reſided at Taranto many months, and during the time in which the bite of a tarantula is ſaid to be moſt pernicious, affirm, that there was not a

phyſician

phyſician in the country, who believed there ever was ſuch a diſtemper, from ſuch a cauſe: that among the vulgar there is a tradition, that diſtempers attended with very extraordinary circumſtances, had been excited by the bite of a tarantula; but that no body ever remembers a ſingle inſtance; and that there is no other ſpider to be found in that country, different from thoſe which are common in moſt warm countries.

TARASCON, a port-town of France, in the province of Provence, ſituated on the river Rhone, eight miles north of Arles.

TARAXACONASTRUM, in botany, the ſame with hyoſeris. See HYOSERIS.

TARAXACONOIDES, in botany, the ſame with the leontodon. See the article LEONTODON.

TARBES, a city of France, in the province of Gaſcony, and territory of Bigorre, ſituated on the river Adour: weſt lon. 3′, and north lat. 43° 16′.

TARCHONANTHUS, in botany, the ſame with the parthenium. See the article PARTHENIUM.

TARE, is an allowance for the outſide package, that contains ſuch goods as cannot be unpacked without detriment; or for the papers, threads, bands, &c. that incloſe or bind any goods imported looſe; or, though imported in caſks, cheſts, &c. yet cannot be unpacked and weighed net. Several ſorts of goods have their tares aſcertained, and thoſe are not to be altered or deviated from, in any caſe, within the port of London; unleſs the merchant thinking himſelf, or the officers of the crown, to be prejudiced by ſuch tares, ſhall deſire that the goods may be unpacked, and the net-weight taken; which may be done either by weighing the goods in each reſpective caſk, &c. net; or (as is practiſed in eaſt-india goods particularly) by picking out ſeveral caſks, &c. of each ſize, and making an average, compute the reſt accordingly. But this muſt not be done without the conſent of two ſurveyors, atteſted by their hands in the landwaiter's books; and in the out-ports, not without the conſent of the collector and ſurveyor. And as to thoſe goods which have not their tares aſcertained, two ſurveyors in London, and the collector and ſurveyor in the out-ports, are to adjuſt and allow the ſame, in like manner. Sometimes the caſks, &c. are weighed beyond ſea, before the goods are put in; and the weight of each reſpective caſk, &c. marked thereon (as is uſual for moſt goods imported from the britiſh plantations), or elſe inſerted in the merchant's invoice; in which caſe, if the real invoice be produced, and the officers have ſatisfied themſelves (by unpacking and weighing ſome of them) that thoſe weights are juſt and true, they do then, after having reduced them to britiſh weight, eſteem them to be the real tares, and paſs them accordingly. But the unpacking goods, and taking the net-weight, being ſuppoſed the juſteſt method, both for the crown and merchant, it is uſually practiſed in the port of London, in all caſes where it can be done with conveniency, and without detriment to the goods.

As the knowledge of tare is of great importance in commerce, we ſhall here add an alphabetical table of ſome principal articles in trade, with their tares, as allowed in the cuſtomhouſe of London.

Alum in caſks, tare 12 per cent.
Antimony in caſks, 6 lb. per cent.
Aſhes, called pot-aſhes, 10 per cent.
Aſhes, called weed-aſhes, 8 lb. per ſack.
Aſſa fœtida, in baſkets, about ¼ Cwt. 3 lb. per baſket.
Barilla in double ſerons, 36 lb. per ſeron.
Beads, called coral beads, in caſes, if covered with rags, 3 per cent. for ſtrings, paper, and rags; but if not covered with rags, then only 2 per cent.
Brimſtone in caſks, 8 lb. per cent.
Bugle, great, in caſks, 3 per cent.
Camphor in tubs about ½ or ¼ Cwt. tare 18 lb.
Canary-ſeeds in barrels of about 2¼ Cwt. at 30 lb. each.
Capers in caſks, tare one third.
Cochineal in cheſts, covered with ſkins, containing about 1½ Cwt. tare 50 lb.
Ditto in barrels, about 1½ Cwt. tare 36 lb.
Ditto in bales of about 200 lb. each 18 lb. per bale.
Ditto in caſks of about 250 lb. each, 42 lb. each.
Coffee in bales, from India, of about 2½ Cwt. 18 lb. per bale.
Ditto in bales, from Turky, of about 3 Cwt. 15 lb. per bale.
Copper-ore in caſks of near 2 Cwt. each, 21 lb. per caſk.
Copperas-green, in caſks of about 10½ Cwt. 10 per cent.
Figs in barrels, 14 lb. per cent.
Flax, undreſſed, in bales or bags about 4¼ Cwt. 6 lb. each.

Galls,

Galls, from Aleppo and Smyrna, in double bags, 7 lb. each.
Gum-arabic in ſacks about 3 Cwt. 10lb. per ſack.
Hemp in fats, 14 lb. per cent.
Hops in bags, 4 lb. per cent.
Indigo in cheſts, covered with ſkins, about 1 ¾ Cwt. 48 lb.
Ditto in bales, with ſkins, about 1½ Cwt. tare 16 lb.
Iron, old buſhel, in caſks about 13 Cwt. 107 lb. each.
Madder, great and ſmall, ſingle and double bags, tare 28 lb.
Pearl barley in caſks of about 4½ Cwt. 45 lb. per caſk.
Pepper, long, from India, in bags about 1 Cwt. 8 lb. per bag.
Pitch, called burgundy-pitch, in ſtands about 2¾ Cwt. tare 56 lb.
Prunelloes in boxes about 14 lb. 3 lb. per box.
Rice in barrels about 4 Cwt. tare as on the caſks.
Sago, from India, in bags about 94 lb. 3 lb. each.
Salt-petre in caſks, 12 lb. per cent.
Smalts, or powder-blue, in caſks, about 4 Cwt. 10 per cent.
Soap, called caſtile-ſoap, in double ſerons about 3 Cwt. 30 lb.
Tallow, from Ruſſia and Ireland, in caſks, 12 lb. per cent.
Turpentine in caſks, tare one fifth part.
Wax, bees-wax in caſks about 10 Cwt. 84 lb. per caſk.
Spaniſh wool in bales, for cloth, about 2 Cwt. tare 28 lb.

TARENTAIS DUTCHY, the ſouth diviſion of Savoy, having Piedmont on the ſouth-eaſt, and Savoy proper on the north-weſt: ſubject to the king of Sardinia.

TARGET, a kind of ſhield or weapon of defence made uſe of by the antients.

TARGOROD, a town of Turky in Europe, in the province of Moldavia, fifty miles ſouth-weſt of Jazy: eaſt longit. 26° 30′, and north lat. 47°.

TARGUM, a name whereby the Jews call the chaldee paraphraſes, or expoſitions, of the Old Teſtament, in the chaldee language. After the captivity, the jewiſh doctors, in order to make the people underſtand the holy ſcripture, which was read in hebrew in their ſynagogues, were obliged to explain the law to them in a language they underſtood, which was the chaldean, or that uſed in Aſſyria. The targums now remaining, were compoſed by different perſons, upon different parts on the part, and both theſe and the reſt of ſcripture, and are eight in number.

TARIF, or TARIFF, a table or catalogue, containing the names of different ſorts of merchandize, with the duties to be paid, as ſettled by authority, amongſt trading nations.

TARIFFA, a port-town of Spain, in the province of Andaluſia, ſituated at the entrance of the ſtreights of Gibraltar, eighteen miles weſt of Gibraltar, and twenty-four miles north of Tangier: weſt longit. 6° 15′, and north lat. 36°.

TARKU, a port-town of Perſia, in the province of Chirvan and territory of Dagiſtan, ſituated on the weſt ſide of the Caſpian ſea, three hundred miles ſouth of Aſtracan: eaſt lon. 51°, north lat. 42°.

TARO, a river of Italy, which riſes in the mountains on the confines of Genoa, and runs, north-eaſt thro' the dutchy of Parma, falling into the Po below Cremona.

TARODANT, a city of Morocco, in Africa, in the territory of Sus, ſituated near the Atlantic ocean, one hundred and twenty miles ſouth of the city of Morocco: weſt long. 10°, and north lat. 30°.

TARPAULIN, a piece of canvas, well tarred over, to keep off the rain from any place. The term is alſo often applied in a burleſque ſenſe to a perſon that has been all his life bred to the ſea.

TARPEIAN, in roman antiquity, an appellation given to a ſteep rock in Rome; whence, by the law of the twelve tables, thoſe guilty of certain crimes were precipitated.

TARPEIAN GAMES, the ſame with thoſe otherwiſe called capitoline. See the article CAPITOLINE.

TARRACE, or TERRACE, a kind of plaſter or mortar. See TERRACE.

TARSO, in the glaſs-trade, a white kind of ſtone, uſed inſtead of ſand, for the fineſt cryſtal-glaſs. See GLASS.

TARSUS, in anatomy, the ſpace between the bones of the leg and the metatarſus, wherein are contained ſeven bones, *viz.* the aſtragalus, calcaneum, os naviculare, os cuboides, and the three oſſa cuneiformia. See ASTRAGALUS, *&c.*

If any of theſe bones happens to be luxated, they ſhould be ſpeedily replaced; for which purpoſe the foot ſhould be extended on an even table, and the ſurgeon is to replace the diſlocated bones with the preſſure of the palms of his hands, adjuſting them alſo with his fingers, where need requires. Compreſſes, dipped in warm ſpirit of wine, are then to be laid

duced bones ſecured in their places, by means of the proper bandages: the patient is then to be enjoined to remain in bed, till the new-ſet bones have acquired a ſufficient ſtrength.

TARSUS is alſo uſed by ſome for the cartilages which terminate the palpebræ, or eyelids, and from which the cilia or hairs ariſe. See the article EYE.

TARSUS, now Teraſſo, once the capital of Cilicia, in the leſſer Aſia, now a province of Aſiatic-Turky, is ſituated on the north ſide of the Levant-Sea: eaſt long. 35°, north lat. 37°.

TARTANE, in naval architecture, a kind of bark, uſed in the Mediterranean, for fiſhing and carriage. It has only a main-maſt and a mizen; its ſails triangular; and when a ſquare ſail is put up, it is called a ſail of fortune.

TARTAR, in natural hiſtory and pharmacy, a hard and almoſt ſtony ſeparation from a vegetable juice, after fermentation. See FERMENTATION.

The common tartar is the produce of wine, being found in large maſſes, adhering to the bottoms and ſides of caſks, in which that liquor has been long kept. We meet with it in large maſſes of an irregular figure, and more or leſs denſe texture, without ſmell, and of a ſubacid taſte.

The common crude tartar is of two kinds, the white and the red; this difference of colour, being owing to that of the wine they are produced from, is of little conſequence in itſelf, but it is an indication of more eſſential differences in the matter. The white tartar is much more pure and clean than the red, and is, though equally hard, conſiderably leſs heavy. We have this principally from Germany, where it is, at times, cleared off from the ſides of very large veſſels, in which they keep their white wines for many years. The red tartar is brought in large quantities from Italy, and ſome parts of France. The white tartar is to be choſen for medicinal uſe, and particularly ſuch as is of a compact texture, not ſpongy or cavernous, when broken, and free from dirt, or other foulneſſes, and ſuch as has a ſort of cryſtallizations on its ſurface. Tartar is, properly ſpeaking, the eſſential ſalt of the grape. Tartar contains a large portion of acid ſalt, and of an oil, in part thin and limpid, in part thick and coarſe. It affords a ſmall portion of a volatile alkali ſalt in diſtillation, and the reſiduum yields a very large proportion of fixed alkali. It is to be obſerved, that both theſe alkalies ſeem, in ſome degree, creatures of the fire; for neither of them manifeſt themſelves either by their taſte or qualities in the tartar, any more than in many other ſubſtances, which yet afford much of them by analyſis, till they have felt the operation of the fire.

Tartar diſſolves in boiling-water, but with great difficulty in cold; and even when purified, and brought to the ſtate of what we call cryſtal, or cream of tartar, it retains the ſame quality. Tartar is ſcarce ever given internally in its crude ſtate. The preparations now in uſe are theſe.

Cryſtals of Tartar. Powder a quantity of white tartar, and boil it in a ſufficient portion of water till it be in a great part diſſolved, the foulneſs only remaining behind. Pour this decoction, while hot, through a flannel-bag, let it ſtand till cold, and there will be cryſtals formed at the ſides of the veſſel; theſe are the cryſtals of tartar. They may be diſſolved by boiling a ſecond time, and ſet to ſhoot again, and by this means they will be rendered the more pure. The French, who prepare great quantities of theſe cryſtals about Montpelier, firſt diſſolve a ſmall quantity of white earth of the nature of chalk, in the water in which they are to be boiled, for the ſecond ſolution. This earth renders the water milky, but the cryſtals ſhoot perfectly clear in it, and whatever foulneſs they carried with them at their firſt ſhooting, will be, by this means, more perfectly ſeparated from them.

It was formerly a cuſtom to ſeparate firſt the ſalt which ſhot to the top of the liquor in form of a thin ſkin or film, and this was ſuppoſed purer than the reſt, and called cream of tartar; but it is wholly the ſame with the cryſtals that ſhoot to the ſides of the veſſel, and nobody now trouble themſelves to keep it ſeparate.

The cryſtals of tartar, or, as we commonly expreſs it, cream of tartar, is a gentle purge; it attenuates and reſolves tough humors, and is good againſt obſtructions of the viſcera, and in cachectic complaints.

Fixed ſalt of TARTAR. Take any quantity of tartar at pleaſure, put it into a crucible, and calcine it for eight hours in an open fire; then pour boiling water on it, and ſet it over the fire till all the ſalt be diſſolved. Filtre the ſolution, and evaporate it to a dryneſs in a ſand-heat; there will remain, at the bottom

of

of the veſſel, a white fixed alkaline ſalt. If it is not ſo pure as it ought to be, diſſolve it in fair-water; filtre the ſolution, and evaporate it to a dryneſs as before; after which it may be calcined for half an hour in a crucible; it will then be perfectly pure, and muſt be kept in a phial cloſe ſtopped, for it eaſily melts if the air comes to it.

If this ſalt be expoſed to a damp air, as in a vault, or other ſuch place, in a flat earthen veſſel, it runs into a heavy liquor, which is to be filtred, to ſeparate it from any foulneſs it may have accidentally contracted, and is the oleum tartari per diliquium.

The fixed ſalt of tartar is very acrid and cauſtic; ſome attribute great virtues to it, as a diuretic; and our apothecaries too frequently uſe it in the place of ſalt of wormwood. They, indeed, buy it as ſuch; and what is yet more unfair in the ſeller, is what he calls by either of theſe names of ſalt of tartar or ſalt of wormwood, as it is more or leſs purified, is often not truly either, but is prepared from the common ruſſia pot-aſh, diſſolved and purified. This fixed alkali is of great uſe in opening the bodies of reſinous and ſulphureous ſubjects, and making them yield a ſtronger tincture to ſpirit of wine, or water, than they otherwiſe would do. It is often mixed alſo with purges to quicken the operation. Caution ought to be taken, when it is given internally, either that it be firſt diſſolved by an acid, as in the ſaline draughts; or elſe blended with a large quantity of liquor, to prevent its proving too acrid as it paſſes the œſophagus.

Tincture of ſalt of TARTAR. Put a quantity of ſalt of tartar into a good crucible; ſet it in an open fire, and calcine it for ſome hours, raiſing the fire, at laſt, to ſuch a degree as to make the ſalt ready to melt; then pour it into a clean marble mortar, grind it ſome time, and while yet hot, put it into a matraſs heated beforehand; pour a quart of rectified ſpirits of wine on four ounces of this calcined ſalt, and let it ſtand in a ſand-heat three or four days, in which time, if the proceſs have been rightly managed, the ſpirit will become of a ſtrong yellowiſh colour, and is then to be filtred off for uſe.

People who make this tincture, find it difficult to give the ſpirit the true colour. This tincture is attenuant and reſolvent, given from ten to thirty drops: it is alſo of great uſe in extracting the tinctures of vegetable and mineral ſubſtances, which would not impart any colour to ſimple ſpirit of wine.

Foliated TARTAR, *or regenerated* TARTAR. Take any quantity of dry ſalt of tartar powdered, put it in a large glaſs veſſel, and pour thereon, by degrees, as much ſpirit of vinegar as will ſaturate the ſalt; filtre the fluid, and evaporate it over a gentle fire to dryneſs, taking great care that the matter does not contract any empyreuma. On the ſalt which remains after this evaporation, pour out as much freſh vinegar as will again ſaturate it; then filtre the fluid, and carefully dry it by evaporation.

This ſalt has a febrifuge and deobſtruent quality. The doſe may be from ten grains to one ſcruple, to be taken in a glaſs of water, and repeated every fourth or ſixth hour, according to the exigence of the caſe.

Emetic TARTAR, a preparation of antimony with tartar. See ANTIMONY.

Soluble TARTAR is thus made: Diſſolve a pound of fixed alkaline ſalt in a gallon of boiling-water, and gradually throw in cryſtals of tartar as long as a freſh addition thereof riſes any efferveſcence, which generally ceaſes before three pounds of the cryſtals have been uſed: then filtre the liquor; and, after due evaporation, ſet it by to cryſtallize. This ſalt has been long eſteemed both as a medicine and a menſtruum: it is aperient, attenuates viſcid juices, promotes the urinary ſecretion, and gently looſens the belly: the doſe is from ten grains to a dram or two, or more. It is alſo uſed as an addition to the reſinous purgatives, as it promotes their action, and at the ſame time prevents their griping quality.

Vitriolated TARTAR is ordered, by the College of London phyſicians, to be made thus: Diſſolve eight ounces of green vitriol in four pints of boiling water; and while the liquor continues boiling, throw into it ſalt of tartar, or any other alkaline ſalt, till no efferveſcence ariſes upon throwing in a freſh addition, which generally happens when four ounces, or a little more of the ſalt have been uſed: filtre the liquor through paper, and after due evaporation ſet it by to cryſtallize.

Vitriolated tartar is aperient, exhibited in ſmall doſes of a ſcruple, or half a dram, attenuates viſcid juices, and promotes the fluid ſecretion. In larger doſes it proves a mild and ſafe cathartic.

TARTARY,

TARTARY, a vaſt country in the northern parts of Aſia, bounded by Siberia on the north and weſt: this is called Great-Tartary. The Tartars who lie ſouth of Moſcovy and Siberia, are thoſe of Aſtracan, Circaſſia, and Dagiſtan, ſituated north-weſt of the Caſpian ſea the calmuc Tartars, who lie between Siberia and the Caſpian-ſea: the uſbec Tartars and Moguls, who lie north of Perſia and India: and, laſtly, thoſe of Tibet, who lie north-weſt of China.

TASSEL, a ſort of pendant ornament at the corners of a cuſhion, or the like.

In building, taſſels denote thoſe pieces of board that lie under the ends of the mantle trees.

TASSO, or THASSUS, a ſmall iſland in the Archipelago, thirty miles north of Lemnos.

TASTE, in phyſiology, a peculiar ſenſation excited by means of the organs of taſte, *viz.* the papillæ on the tongue. See the article TONGUE.

The taſtes of bodies depend on a certain determinate magnitude of their particles, adapted to excite different ſenſations by means of the papillæ of the tongue.

Savours, which are the objects of the taſte in general, proceed chiefly from the ſaline parts, which are found in all matters, whether animal or vegetable, which we take either as food or phyſic. Theſe little angular pungent bodies are fitter than others to penetrate even to the immediate organ, and to make themſelves perceived there: we may judge of them by putting a grain of pure ſalt, of any kind whatever, upon the tongue, where it will make a very ſtrong impreſſion; and their analyſis diſcovers, that, of all mixed bodies, thoſe that affect the organ moſt, are ſuch as abound moſt in ſalts. See SALT.

The moſt ſimple ſavours, and upon which men are more generally agreed, are thoſe wherein the ſalts are the leaſt mitigated by the mixture of other matters. Every one knows what is meant by ſalt, ſour, ſweet, bitter, harſh, *&c.* theſe different ſenſations are ſo remarkable that they are preſently diſtinguiſhed: they are, as it were, the baſis of all others, which become ſo much the more difficult to deſcribe and expreſs, the more they recede from their primary ſimplicity. The bitterneſs of coffee, for example, corrected by the ſweetneſs of ſugar, produces a mixed ſenſation; the juice of fruits, mingled with ſpirit of wine, takes a new taſte: the taſte of victuals changes almoſt entirely, and is diſguiſed a thouſand different ways, by that infinite number of preparations and mixtures, which the preſent age has rendered an important art.

TASTE is alſo uſed, in a figurative ſenſe, for the judgment and diſcernment of the mind.

We conſtantly hear talk of good and bad taſte, without well underſtanding the meaning of theſe terms: in effect, a good taſte ſeems, at bottom, to be little elſe but right reaſon, which we otherwiſe expreſs by the word judgment. Mad. Scudery, and Mad. Dacier, call good taſte a harmony between the mind and reaſon; and according as that harmony is more or leſs juſt, the perſon has more or leſs of this taſte.

TATA, or SINDA, the capital of a province of the ſame name in the hither India, in Aſia, ſituated at the mouth of the Indus: eaſt long. 68°, north lat. 25° 40'.

TATIANITES, in church-hiſtory, chriſtian heretics in the ſecond century; ſo called from their leader Tatian, a diſciple of St. Juſtin.

This hereſiarch took from Valentinus the fable of the Æons, and from Marcion the doctrine of two principles. But what particularly diſtinguiſhed his followers was, their condemning of marriage, and forbidding the eating of fleſh or drinking of wine.

TATTERSHALL, a market-town of Lincolnſhire, eighteen miles ſouth-eaſt of Lincoln.

TAT-TOO, q. d. TAP-TO, a beat of a drum at night, to advertiſe the ſoldiers to retreat or repair to their quarters in their garriſon, or to their tents in a camp.

TAU, or TAW, in heraldry, an ordinary in figure of a T, ſuppoſed to repreſent St. Andrew's croſs, or a croſs potence, the top part cut off. See CROSS.

TAVASTUS, the capital of the province of Tavaſtia, in the territory of Finland, in Sweden, ſituated eighty-four miles north-eaſt of Abo: eaſt long. 24°, north lat. 61° 20'.

TAUBER, a river of Germany, which, riſing in Franconia, paſſes by Mergentheim, and falls into the river Maine at Wertheim.

TAVERNA, a town of the further Calabria, ſituated ſeventy miles north-eaſt of Reggio.

TAUGHT, or TAU'T, in the ſea language, ſignifies the ſame as ſtiff, or faſt: thus, to ſet taught the ſhrowds, or ſtays, is to make them more tight and ſtiff.

TAVIRA, a city of Algarva, in Portugal: weſt long. 8° 32′, north lat. 37°.

TAVISTOCK, a borough of Devonſhire, thirty-two miles weſt of Exeter. It ſends two members to parliament, and gives the title of marquis to the noble family of Ruſſels, dukes of Bedford.

TAUNT, or TAUNT-MASTED, is ſaid of a ſhip whoſe maſts are too tall for her.

TAUNTON, a borough of Somerſetſhire, twenty miles ſouth weſt of Wells. It ſends two members to parliament.

TAURILIA, in roman antiquity, certain religious games, celebrated to appeaſe the infernal gods.

TAURIS, or TABRIS, a city of Perſia, four hundred miles north of Iſpahan: eaſt long. 46° 30′, north lat. 38° 20′.

TAURUS, the BULL, in zoology. See the article BULL.

TAURUS, in aſtronomy, one of the twelve ſigns of the zodiac, the ſecond in order, conſiſting of forty-four ſtars, according to Ptolomy; of forty-one, according to Tycho; and of no leſs than one hundred and thirty-five, according to the britannic catalogue. See ZODIAC.

TAURUS is alſo the name of a ridge of mountains which run through the leſſer Aſia, from weſt to eaſt.

TAUTOLOGY, in rhetoric, a needleſs repetition of the ſame thing in different words.

TAW, or TAU. See the article TAU.

TAWING, the art of dreſſing ſkins in white, ſo as to be fit for divers manufactures, particularly gloves, &c.

All ſkins may be tawed; but thoſe chiefly uſed for this purpoſe are lambs, ſheep, kids, and goats-ſkins.

The method of tawing is this: Having cleared the ſkins of wool or hair, by means of lime, &c. as deſcribed under the article SHAMMY, they are laid in a large vat of wood or ſtone, ſet on the ground full of water, in which quick-lime has been ſlaked, wherein they are allowed to lie a month or ſix weeks, according as the weather is more or leſs hot, or as the ſkins are required to be more or leſs ſoft and pliant.

While they are in the vat, the water and lime is changed twice, and the ſkins are taken out and put in again every day; and when they are taken out for the laſt time, they are laid all night to ſoak in a running water, to get out the greateſt part of the lime; and in the morning are laid together by ſixes one upon another, upon the wooden leg (and are ſcraped ſtoutly one after another, to get the fleſh off from the fleſhy ſide, with a cutting two handled inſtrument called a knife, and then they cut off the legs, if they are not cut off before) and other ſuperfluous parts about the extremes. Then they are laid in a vat or pit with a little water, where they are ſulled with wooden peſtles for the ſpace of a quarter of an hour, and then the vat is filled up with water, and they are rinſed in it.

In the next place, they are thrown on a clean pavement to drain, and afterwards caſt into a freſh pit of water, out of which they rinſe them well, and are laid again on the wooden leg, ſix at a time, with the hair-ſide outermoſt, over which they rub a kind of whetſtone very briſkly to ſoften and fit them to receive four or five more preparations, given them on the leg, both on the fleſh ſide and the hair ſide, with the knife, after the manner above mentioned.

After this they are put into a pit of water and wheaten-bran, and ſtirred about in it with wooden poles, till the bran is perceived to ſtick to them, and then they are left; as they riſe of themſelves to the top of the water by a kind of fermentation, they are plunged down again to the bottom, and at the ſame time fire is ſet to the liquor, which takes as eaſily as if it were brandy, but goes out the moment the ſkins are all covered.

They repeat this operation as often as the ſkins riſe above the water; and when they have done riſing they take them out, lay them on the wooden leg, the fleſhy ſide outwards, and paſs the knife over them to ſcrape off the bran.

Having thus cleared them of the bran, they lay the ſkins in a large baſket, and load them with huge ſtones to promote their draining: and when they have drained ſufficiently, they give them their feeding, which is performed after the manner following:

For one hundred of large ſheep-ſkins, and for ſmaller in proportion, they take eight pounds of alum, and three of ſea-ſalt, and melt the whole with water in a veſſel over the fire, pouring the diſſolution out, while yet luke-warm, into a kind of trough, in which is twenty pounds of the fineſt wheat-flower, with the yolks of eight dozen of eggs; of all

which is formed a kind of paſte, a little thicker than children's pap; which, when done, is put into another veſſel, to be uſed in the following manner:

They pour a quantity of hot water into the trough in which the paſte was prepared, mixing two ſpoonfuls of the paſte with it; to do which they uſe a wooden ſpoon, which contains juſt as much as is required for a dozen of ſkins: and when the whole is well diluted, two dozen of the ſkins are plunged into it; but they take care that the water be not too hot, which would ſpoil the paſte and burn the ſkins.

After they have lain ſome time in the trough, they take them out, one after another, with the hand, and ſtretch them out; this they do twice; and after they have given them all their paſte, they put them into tubs, and there full them afreſh with wooden peſtles.

Then they put them into a vat, where they are ſuffered to lie for five or ſix days, or more; then they take them out in fair weather, and hang them out to dry on cords or racks, and the quicker they are dried the better; for if they be too long a drying, the ſalt and alum within them are apt to make them riſe in a grain, which is an eſſential fault in this kind of dreſſing.

When the ſkins are dry, they are made up into bundles, and juſt dipt in fair water, and taken out and drained; and being thrown into an empty tub, and after having lain ſome time are taken out and trampled under foot.

Then they draw them over a flat iron-inſtrument, the top of which is round like a battledore, and the bottom fixed into a wooden block, to ſtretch and open them; and having been opened, they are hung in the air upon cords to dry: and being dry, they are opened a ſecond time, by paſſing them again over the ſame inſtrument.

In the laſt place they are laid on a table, pulled out, and laid ſmooth, and are then fit for ſale.

After the ſame manner are dreſſed horſes, cows, calves-ſkins, &c. for the ſadlers, harneſs-makers, &c. as alſo thoſe of dogs, wolves, bears, &c. except that in theſe they omit uſing the paſte, ſalt and alum-water being ſufficient.

TAX, a tribute rated upon every town, which formerly was wont to be paid annually into the King's-exchequer, but now not without conſent of parliament; it differs from a ſubſidy in this, that it is always certain, as ſet down in the exchequer-book, and in general levied of every town, and not particularly of every man, &c. The antient way of levying taxes was by tenths and fifteenths, afterwards by ſubſidies and royal aids, and at length by a pound rate; the former of theſe were all upon the perſon and perſonal eſtate, but the laſt upon lands and rents. In the late reigns, a land-tax has been annually granted of two, three, or four ſhillings in the pound, according to preſent exigencies, to be levied by commiſſioners on the ſeveral counties, cities, towns, &c. And in reſpect of this tax, the tenants, or occupiers, of the land are to be charged or aſſeſſed, and the ſame deducted out of the rent due to the landlords: and if any perſons refuſe to pay what they are rated, the collectors in every pariſh may levy it by diſtreſs and ſale of their goods; but in caſe they are over-rated, they may be relieved by an appeal to the commiſſioners, who have power to charge the overplus on others, as they ſhall ſee cauſe; or where there appears to be a deficiency, they may make a re-aſſeſſment, &c. See TRIBUTE, &c.

TAXIS, a term uſed by Vitruvius for what is now called ordonnance, being that which gives every part of a building its juſt dimenſions with reſpect to its uſes. See the article ORDONNANCE.

TAXUS, the YEW-TREE, in botany, a genus of the *dioecia-monadelphia* claſs of plants, without any corolla. The calyx of the male flower is compoſed of three leaves: the ſtamina are numerous: the ſeed is ſingle, and ſurrounded by an undivided baccated calyx: the tree is very ſlow in growing, but there are many very large ones upon ſome barren cold ſoils in divers parts of England: the timber is much eſteemed for many uſes.

TAXUS, in zoology, a name uſed by ſome authors for the meles, or badger. See the article MELES.

TAY, a river of Scotland, riſing from the loch, or lake, of Tay, in Broadalbin, and running eaſt through Athol: it afterwards turns ſouth-eaſt, and dividing the counties of Perth and Angus from Strathern and Fife, falls into the frith of Tay.

TAYVEN, a city of China, in Aſia, in the province of Xanſi, two hundred and forty miles ſouth-weſt of Pekin: eaſt long. 108°, north lat. 38° 30'.

TCHELMINAR. See CHILMINAR.

TEA, *thea*, in botany, a genus of the *polyandria monogynia* class of plants, the corolla of which consists of six large, roundish, hollow, equal petals: the fruit is a capsule, formed of three globular bodies growing together: it contains three cells, in each of which is a single seed, globose, and internally angulated. This shrub grows to five or six feet high, and is very ramose: its root is spreading and fibrous: the leaves are about an inch long, near half an inch broad, serrated, and terminating in a point. The traders in tea distinguish a vast many kinds of it, as they differ in colour, flavour, and the size of the leaf. They are all, however, the leaves of the same tree, only differing according to the seasons when they are gathered, and the manner of drying. To enumerate the several subdistinctions were endless; the general division is into three kinds, the ordinary green-tea, the finer green, and the bohea; to one or other of which all the other kinds may be referred. The common green-tea has somewhat small and crumpled leaves, much convoluted, and closely folded together in the drying. Its colour is a dusky-green, its taste subastringent, and its smell agreeable. It gives the water a strong yellowish-green colour. The fine green has larger leaves, less rumpled and convoluted in the drying, and more lax in their folds; it is of a paler colour, approaching to the blue-green, of an extremely pleasant smell, and has a more astringent, yet more agreeable, taste than the former. It gives a pale-green colour to water. To this kind are to be referred all the higher priced green-teas, the hyson, imperial, &c. The bohea consists of much smaller leaves than either of the other, and those more crumpled and closely folded than in either. It is of a darker colour than the other, often blackish, and is of the smell and taste of the others, but with a mixed sweetness and astringency. The green teas have all somewhat of the violet-flavour; the bohea has naturally somewhat of the rose smell. The leaves when gathered are dried with great caution, partly by the help of heat, partly by the air, and when thoroughly prepared will keep a long time fresh and good. Every parcel, when dried, tho' gathered promiscuously, is separated, according to the largeness and smallness of the leaves, into three or four different kinds, each of which is of a different price, and has its different name. The bohea tea is gathered before the leaves are perfectly opened, and is made to undergo a greater degree of heat in the curing, to which its colour and peculiar flavour is in a great measure owing.

Tea, moderately and properly taken, acts as a gentle astringent and corroborative: it strengthens the stomach and bowels, and is good against nauseas, indigestions, and diarrhœas. It acts also as a diuretic and diaphoretic; but its virtues in these particulars are in a great measure to be attributed to the quantity of warm water drank on the occasion. The good qualities of tea do not prevent its often doing harm. Even in China, where the virtues of tea are so vastly extolled, the people who drink it to great excess are often thrown into diabetes, and die emaciated by it.

Tea, imported from India, for every 100 pound, gross value, at the sale, pays a duty of 18l. 18s. $7\frac{65\frac{3}{4}}{100}$d. And the inland duty for every pound weight, is one shilling; and for every hundred pounds, gross-value, at the sale, twenty-five pounds.

TEAL, or TEALE, in ornithology, the anas, with a green spot on the wing, and a white line both above and below the eyes; being the smallest, most elegant and valuable of all the duck-kind. See ANAS and CIRCIA.

TEARS, *lachrymæ*, a lymph or aqueous humour, which is subtile, limpid, and a little saltish: it is separated from the arterial blood by the lachrymal glands, and small glandulous grains on the inside of the eye-lids. This fluid serves to moisten and deterge the eyes and the eye-lids, after which it tends to the internal angle of the eye, and is absorbed by the puncta lachrymalia, and conveyed to the lachrymal bag, from whence it goes into the nose, by the nasal canal. See LACHRYMALIA.

TEASEL, or TEAZEL, in botany. See the article DIPSACUS.

TEBETH, the tenth month of the jewish ecclesiastical year, and fourth of the civil. It answers to our month of December.

TECKLENBURG, a city of Germany, in the circle of Westphalia, capital of a county of the same name, thirteen miles south-

ſouth-weſt of Oſnabrug, ſubject to its own count: eaſt long. 7° 20′, north lat. 52° 21′.

TECHNICAL expreſſes ſomewhat relating to arts or ſciences: in this ſenſe we ſay technical terms. It is alſo particularly applied to a kind of verſes wherein are contained the rules or precepts of any art, thus digeſted to help the memory to retain them; an example whereof may be ſeen in the article MEMORY.

TECUM DUCES. See DUCES.

TE DEUM, the name of a celebrated hymn, uſed in the chriſtian church, and ſo called becauſe it begins with theſe words, *Te Deum laudamus*; We praiſe thee, O God. It is ſung in the romiſh church, with great pomp and ſolemnity, upon the gaining of a victory, or other happy event.

TEETH. See the article TOOTH.

TEES, a river which riſes on the confines of Cumberland, and running eaſtward divides the county of Durham from Yorkſhire, and falls into the German ſea below Stockton.

TEFLIS, the capital of perſian Georgia, in Aſia, ſituated on the river Kur, or Cyrus, three hundred miles north of Tauris, and as many ſouth of Aſtracan: eaſt long. 47° 20′, north lat. 43°.

TEGAPATAN, a port-town of the hither India, in Aſia, near cape Comorin, eighty miles ſouth of Cochin, and a hundred and ſixty north-weſt of Columbo in Ceylon: eaſt long. 76°, north lat. 8°

TEGUMENT, or INTEGUMENT, any thing that ſurrounds or covers another.

The common teguments of the human body are the cutis, cuticle, and fat. See the article CUTIS, *&c.*

TEHAMA, one of the diviſions of Arabia felix, in Aſia, ſituated on the Red ſea, between the provinces of Mecca and Hadramut.

TEINTS and SEMI-TEINTS, in painting, denotes the ſeveral colours uſed in a picture, conſidered as more or leſs high, bright, deep, thin or weakened, and diminiſhed, *&c.* to give the proper relievo, ſoftneſs, or diſtance, *&c.* of the ſeveral objects.

TEIRCE, or TIERCE. See TIERCE.

TEISSE, or TEYS, a river of Hungary, which riſes in the Carpathian mountains, and running from eaſt to weſt, paſſes by Tockay; then turning ſouth, paſſes by Zolnock and Segedin, and having joined the river Meriſh, falls into the Danube, oppoſite to Salankamen.

TEKUPHÆ, or THEKUPHÆ, in the jewiſh chronology, are the times wherein the ſun proceeds from one cardinal point to the next.

TELAMON, or ATLAS, a name given to thoſe figures or half figures of men ſo commonly uſed inſtead of columns or pilaſters, to ſupport any member in architecture, as a balcony, or the like.

TELEPHIASTRUM, in botany, the ſame with the anacampſeos or orpine. See the article ORPINE.

TELEPHIOIDES, or ANDRACHNE, in botany, a genus of the *monoecia-pentandria* claſs of plants; the corolla of the male-flower is formed of five emarginated ſlender petals, ſhorter than the cup: the female-flower has no corolla; the fruit is a capſule containing three cells, with two obtuſe trigonal ſeeds, roundiſh on the one ſide, and angular on the other.

TELEPHIUM, in botany, a genus of the *pentandria-trigynia* claſs of plants, the corolla of which conſiſts of five erect, oblong, obtuſe petals, narroweſt at the baſe; the fruit is a ſhort triquetrous capſule, formed of three valves, and having only one cell; the receptacle is free, and of about half the length of the capſule; the ſeeds are numerous and roundiſh.

TELESCOPE, an optical inſtrument conſiſting of ſeveral lenſes, by means of which remote objects are ſo magnified as to appear nigh at hand. See LENS.

That the teleſcope is of a modern invention is moſt certain; neither does it appear that microſcopes, or optic glaſſes of any kind, were known to the antients. It is contended, that Alexander de Spina, a native of Piſa, was the firſt that made the uſe of glaſſes known to the world; but our countryman, friar Bacon, who died twenty-one years before him, was, in all probability, acquainted with them firſt; for he wrote a book of perſpective, in which he plainly ſhews that he did not only underſtand the nature of convex and concave glaſſes, but the uſe of them when combined in teleſcopes; though he no where, in that treatiſe, diſcovers the manner in which they are to be put together. The teleſcope, with the concave eye-glaſs, was firſt invented by a mechanic of Middleburgh in Zealand, called Z. Johannides, about the year 1590, though J. Lipperhoy, another Dutchman, is candidate for the ſame diſcovery. From whence this ſort of teleſcope is called tubus batavus.

Franciſcus

Franciſcus Fontana, a Neapolitan, contends, that he was the firſt contriver of the teleſcope compoſed of two convex glaſſes, which is now the common aſtronomical teleſcope; and Rheita pretends to be the firſt that rendered that teleſcope fit for terreſtrial uſes, by adding two eye-glaſſes to it.

The teleſcope is of two ſorts, *viz.* dioptric, or refracting; or cata-dioptric, by reflection and refraction conjointly.

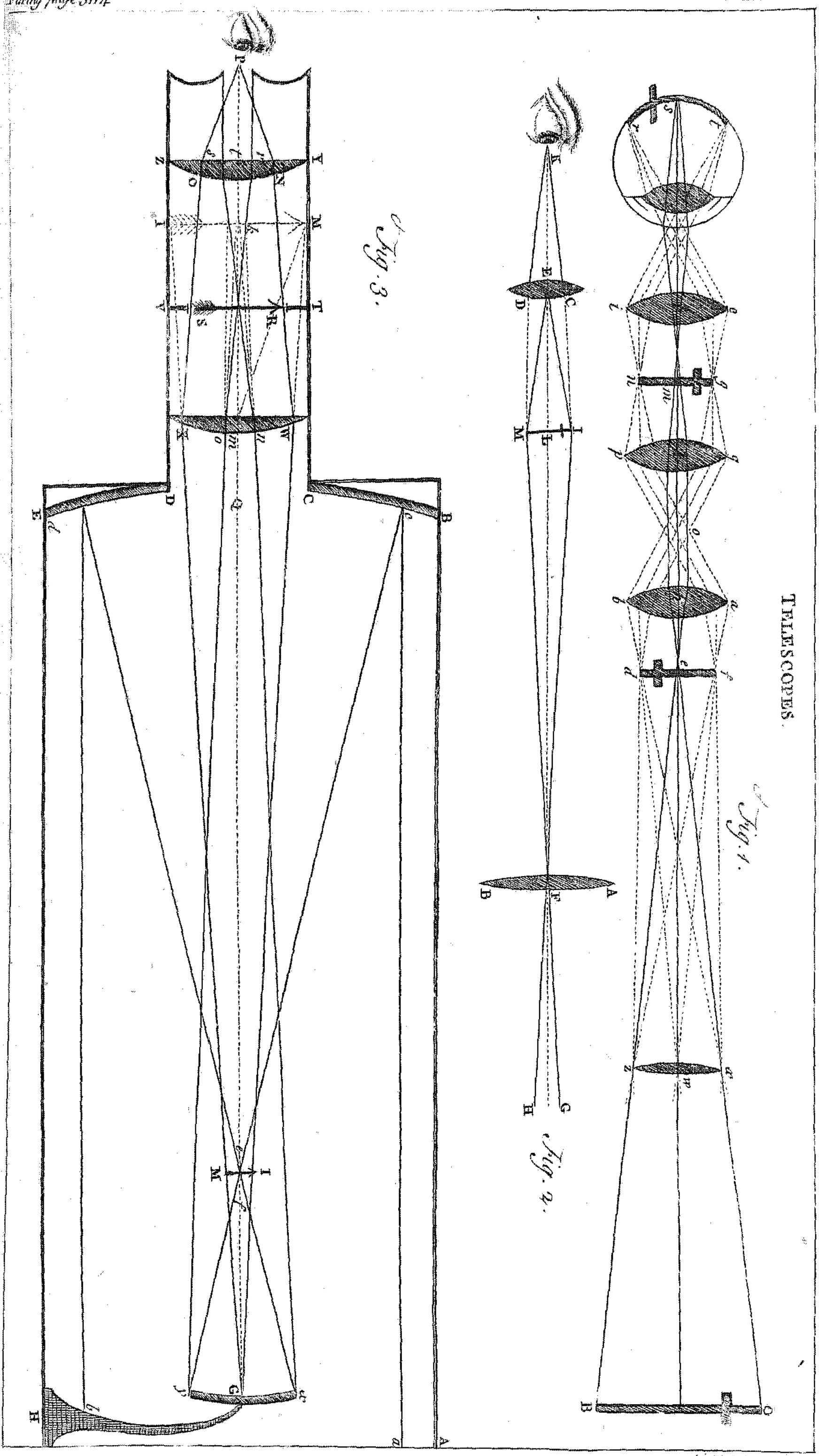
Dioptric or refracting TELESCOPE conſiſts of an object-glaſs *x z* (plate CCLXXI. fig. 1.) by which the image *f d* of an object O B, at a diſtance, is formed in the focus *e* of the ſaid glaſs, and in an inverted poſition. This image may be viewed by a ſingle lens, *a b*, placed at its focal diſtance, as is uſually done for viewing the heavenly bodies, becauſe in them we do not regard the poſition: but for viewing objects near us, whoſe image we would have erect, we muſt, for that purpoſe, add a ſecond lens *p q*, at double its focal diſtance from the other, that the rays which come from *a b* may croſs each other in the focus *o*, in order to erect the image *g n*, which it will form in its own focus *m*, becauſe the rays come parallel from the firſt lens *a b*. Laſtly, a third lens *i c* is added, to view the ſecondary image *g n*. Theſe three lenſes, or eye-glaſſes, are uſually of the ſame ſize and focal length; and the power of magnifying is always as the focal length of the object-glaſs *e w* divided by the focal length of the eye-glaſs *l m* or *h e*: for inſtance, ſuppoſe *e w* = 10 feet or 120 inches, and *h e* or *l m* = 3 inches; then will the object appear to the eye, through ſuch a teleſcope, 40 times bigger than to the naked eye; and its ſurface will be magnified 1600 times, and its bulk or ſolidity 64000 times.

If inſtead of a convex eye-glaſs we ſhould uſe a concave one of the ſame focal length, it would repreſent the object erect, equally magnified, and more diſtinct and bright; but the diſadvantage of this glaſs is, that it admits but of a ſmall area, or field of view, and, therefore, not to be uſed when we would ſee much of an object, or take in a great ſcope; but it is uſed to great advantage in viewing the planets and their ſatellites, ſaturn's ring, jupiter's belts, *&c.*

The magnifying power of a refracting teleſcope is thus eſtimated: let A B (*ibid.* fig. 2.) be the object-glaſs, and C D the eye-glaſs; and let H F I and G F M be two rays coming from the extreme parts of a diſtant object, and croſſing each other in the center F of the glaſs A B. Then is the angle G F H = I F M that under which the object appears to the naked eye; but I E M = C E D is that under which the image appears as magnified by the eye-glaſs C D. But the angle I E M is to the angle I F M, as L F to L E, or as the focal diſtance of the object-glaſs to the focal diſtance of the eye-glaſs; and in that proportion is the object magnified.

There is a defect in all teleſcopes of this kind, not to be remedied by any means whatever, which was thought only to ariſe from hence, *viz.* that ſpherical glaſſes do not collect rays to one and the ſame point; but it was happily diſcovered by Sir Iſaac Newton, that the imperfection of this ſort of teleſcope, ſo far as it ariſes from the ſpherical form of the glaſſes, bears almoſt no proportion to that which is owing to the different refrangibility of light. This diverſity in the refraction of the rays is about a twenty-eighth part of the whole, ſo that the object-glaſs of a teleſcope cannot collect the rays, which flow from any one point in the object, into a leſs room than the circular ſpace whoſe diameter is about the fifty ſixth part of the breadth of the glaſs. Therefore, ſince each point of the object will be repreſented in ſo large a ſpace, and the centers of thoſe ſpaces will be contiguous, becauſe the points in the objects the rays flow from are ſo, it is evident that the image of an object made by ſuch a glaſs muſt be a moſt confuſed repreſentation, though it does not appear ſo when viewed through an eye-glaſs that magnifies in a moderate degree; conſequently, the degree of magnifying in an eye-glaſs muſt not be too great with reſpect to that of the object-glaſs, leſt the confuſion become ſenſible. Notwithſtanding however this imperfection, a dioptrical teleſcope may be made to magnify in any given degree, provided it be of ſufficient length; for, the greater the focal diſtance of the object-glaſs is, the leſs may be the proportion which the focal diſtance of the eye-glaſs may bear to that of the object-glaſs, without rendering the image obſcure. Thus an object-glaſs, whoſe focal diſtance is about four feet, will admit of an eye-glaſs whoſe focal diſtance ſhall be little more than one inch, and, conſequently, will magnify almoſt forty-eight times; but an object-

glaſs



J. Jefferys sculp.

glaſs of forty feet focus, will admit of an eye-glaſs of only four inch focus, and will, therefore, magnify 120 times; and an object-glaſs of an hundred feet focus, will admit of an eye-glaſs of little more than ſix inch focus, and will therefore magnify almoſt 200 times.

The reaſon of this diſproportion, in their ſeveral degrees of magnifying, is to be explained in the following manner: ſince the diameters of the ſpaces, into which rays flowing from the ſeveral points of an object are collected, are as the breadth of the object-glaſs, it is evident, that the degree of confuſedneſs in the image is as the breadth of the glaſs (for the degree of confuſedneſs will only be as the diameters or breadths of thoſe ſpaces, and not as the ſpaces themſelves.) Now the focal length of the eye-glaſs, that is, its power of magnifying, muſt be as that degree; for, if it exceeds it, it will render the confuſedneſs ſenſible; and, therefore, it muſt be as the breadth or diameter of the object-glaſs. The diameter of the object-glaſs, which is as the ſquare root of its aperture or magnitude, muſt be as the ſquare root of the power of magnifying in the teleſcope; for, unleſs the aperture itſelf be as the power of magnifying, the image will want light: the ſquare root of the power of magnifying, will be as the ſquare root of the focal diſtance of the object-glaſs; and, therefore, the focal diſtance of the eye-glaſs muſt be only as the ſquare root of that of the object-glaſs. So that in making uſe of an object-glaſs of a longer focus, ſuppoſe than one that is given, you are not obliged to apply an eye-glaſs of a proportionably longer focus than what would ſuit the given object-glaſs, but ſuch a one only whoſe focal diſtance ſhall be to the focal diſtance of that which will ſuit the given object-glaſs, as the ſquare root of the focal length of the object-glaſs, you make uſe of, is to the ſquare root of the focal length of the given one. And this is the reaſon that longer teleſcopes are capable of magnifying in a greater degree than ſhorter ones, without rendering the object confuſed or coloured.

Cata-dioptric, or *reflecting* TELESCOPE, is the moſt noble and uſeful of all others; the mechaniſm of which is as follows:

ABEH (*bid.* fig. 3.) is the large tube, or body of the inſtrument, in which BE is a large reflecting mirrour, with a hole in the middle CD. This mirrour receives the rays *a c*, *b d*, coming from the object at a diſtance, and reflects them converging to its focus *e*, where they croſs each other, and form the inverted image IM; *xy* is a ſmall concave mirrour, whoſe focus is at *f*, at a ſmall diſtance from the image. By this means the rays coming from the image are reflected back through the central hole CD of the large mirrour, where they fall on the plano-convex lens WX, and are by it converged to a focus, and there form a ſecond image RS, very large and erect, which is viewed by a meniſcus eye-glaſs YZ, by the eye at P, through a very ſmall hole in the end of the eye-piece YCDZ. If the firſt lens WX were taken away, the image would be formed ſomewhat larger at *MI*; but the area or ſcope would be leſs, and therefore the view not ſo pleaſant. At TV is placed a circular piece of braſs, with a hole of a proper ſize to circumſcribe the image, and cut off all ſuperfluous or extraneous rays, that ſo the object may appear as diſtinct as poſſible.

As the image is formed by reflection, the rays of every ſort will be united nearly in one point, and will therefore admit of an eye-glaſs YZ of a deep charge, or ſmall focal diſtance; and ſo the power of magnifying will be proportionally increaſed.

The magnifying power of a reflecting teleſcope is thus computed. The parallel rays KB (plate CCLXXII. fig. 1.) and LE are reflected by the large object ſpeculum AF to its focus *a*, where the image IM is formed; which image is defined by two other rays NQ, PQ, coming from the extreme parts of the object at a remote diſtance, and meeting in the center of the large ſpeculum at Q. Now if *f* be the focus of the ſmall mirrour GH, ſuppoſing the image were formed in the ſaid focus *f* (that is, that both the foci *a* and *f* were coincident) then the rays proceeding from the image IM will proceed parallel after reflection, and produce diſtinct viſion of the image, which will then ſubtend an angle IOM at the center O of the ſpeculum GH, which is to the angle IQM, under which the object appears to the naked eye, as *a*Q to *a*O or *f*O. So that the magnifying power would in this caſe be as $\frac{aQ}{fO}$.

But, to increaſe this magnifying power, the image IM is not placed in the focus

of

of the ſmall ſpeculum, but at a ſmall diſtance beyond it; by which means the rays coming from the image to the ſpeculum GH will be reflected converging to a diſtant focus R, where a ſecondary large image *I M* is formed from the firſt image I M; which image IM is ſeen under the ſame angle *I O M* with the former from the center of the ſpeculum GH: but from the center of the eye-glaſs T V it is ſeen under the large angle *I S M*. But the angle *I S M* is to the angle *I O M* as O R to S R; wherefore the ſecond ratio, or part of the magnifying power, is that of $\frac{OR}{SR}$.

Conſequently, the whole magnifying power of the teleſcope is $\frac{aQ}{aO} \times \frac{OR}{SR}$ (becauſe in this caſe *f* O becomes *a* O.) Or, in other words, the angle N Q P, under which the object appears to the naked eye, is to the angle *I S M*, under which the large magnified ſecondary image *I M* appears to the eye through the eye-glaſs, as $\frac{aQ \times OR}{aO \times SR}$. Such is the theory of the teleſcope firſt contrived by Dr. J. Gregory, and therefore called the gregorian teleſcope; but it received its laſt improvement from the late Mr. Hadley, and is now in common uſe.

The machinery for ſupporting and managing this teleſcope, is thus deſcribed by Dr. Smith, Opt. §. 924. The baſe of the pedeſtal *a b* (*ibid.* fig. 3.) is a thick board *a*, reſting upon four braſs feet; one of which being a pin, *p*, that ſcrews through the board, will make it ſteady upon any uneven plane: *b* is a ſmall upright pillar about a foot long, fixed in the board *a*; and *c d* is a braſs-arm, that ſcrews into it: *d e* is a ſhort braſs-piece that turns round upon the end of the arm *c d*, and is tightened and ſtayed by the ſcrew *d*: *e* is a hollow ſocket, with a round braſs-ball in it, moveable every way: the neck of this ball is fixed to the middle of the braſs-piece *f g*, which is fixed along the ſide of the tube *h i*, by the ſcrews *f* and *g*. The eye-glaſſes are placed in the end *l*, and the tube is adjuſted to various diſtances by means of the wire *h i k*. When this teleſcope is uſed at home, the pedeſtal *a b* may be placed upon a table near a window: but when it is uſed abroad, the pedeſtal may be left at home: for having made a hole in the ſide of a tree by the hand-augre *m*, the wood ſcrew at the end of *c d* may be ſcrewed into it.

A ſmall alteration was made in the ſtructure of this teleſcope by Mr. Caſſegrain, *viz.* in uſing a convex ſpeculum *G H* (*ibid.* fig. 1.) inſtead of the concave one G H. Now if they are equally ſpherical, that is, if they are ſegments of the ſame ſphere, then will *f* be alſo the virtual focus of the convex G H; and, if all other things remain the ſame, the firſt image I M will be virtually the ſame as before, and the laſt image *I M* will be really the ſame; ſo that the magnifying power of this form of the teleſcope is $\frac{aQ \times OR}{aO \times SR}$, which is equal to that of Gregory's form.

Sir Iſaac Newton ordered this teleſcope to be made in a different form or manner, as follows: A B C D (*ibid.* fig. 2.) was a large octogonal tube or caſe; E F a large poliſhed ſpeculum, whoſe focus is at *o*; G H a plane ſpeculum truly concentered, and fixed at half a right angle with the axis of the large one. Then parallel rays *a* E, *b* F, incident on the large ſpeculum E F, inſtead of being reflected to the focus *o*, were intercepted by the ſmall plane ſpeculum G H, and by it reflected towards a hole *c d* in the ſide of the tube, croſſing each other in the point O, which is now the true focal point; and from thence they proceed to an eye-glaſs *e f* placed in that hole, whoſe focal diſtance is very ſmall, and therefore the power of magnifying may be very great in this form of the teleſcope; becauſe the image I M is made by one reflection (for that of the plane ſpeculum only alters the courſe of the rays, and adds nothing to the confuſion of the image) and will, for that reaſon, bear being viewed by a glaſs of a very deep charge, in compariſon of an image formed by differently refrangible rays.

This teleſcope is a very good one, as to its effect or performance, but is not ſo commodious for common uſe as thoſe of the gregorian form, and is therefore now pretty much laid aſide. They who would ſee a larger account hereof, may conſult Sir Iſaac's Optics, and ſeveral Philoſophical Tranſactions, where he deſcribes it at large, and the reaſons which induced him to make choice of this ſtructure rather than that of Dr. Gregory: or ſee a compendious account of the whole in the laſt edition of Dr. Gregory's Elements of Optics.

Solar

TELESCOPES.

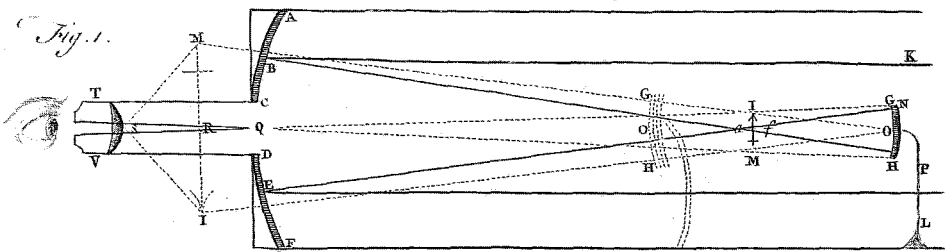


Fig. 1.

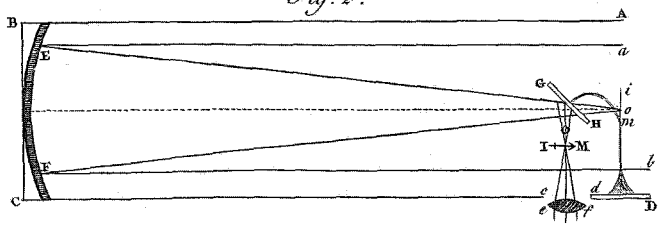


Fig. 2.

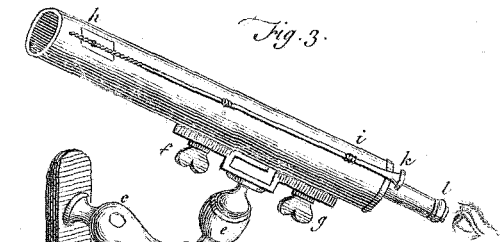
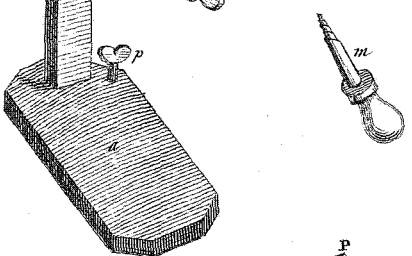


Fig. 3.



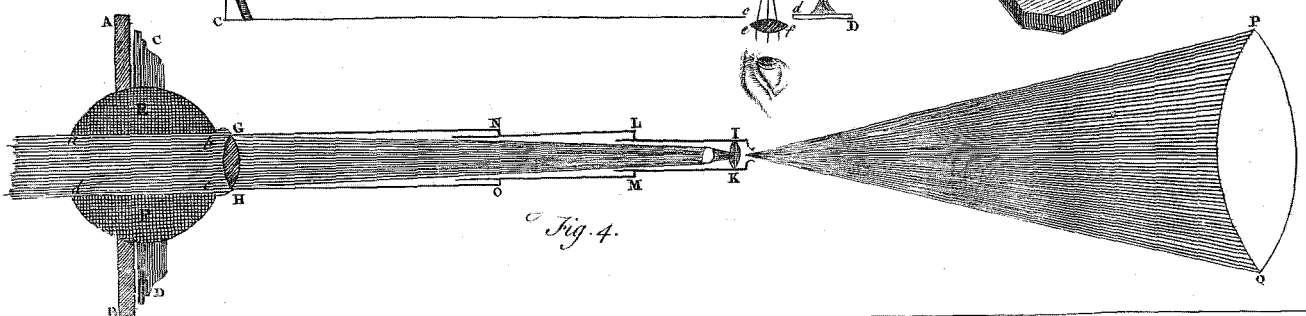


Fig. 4.

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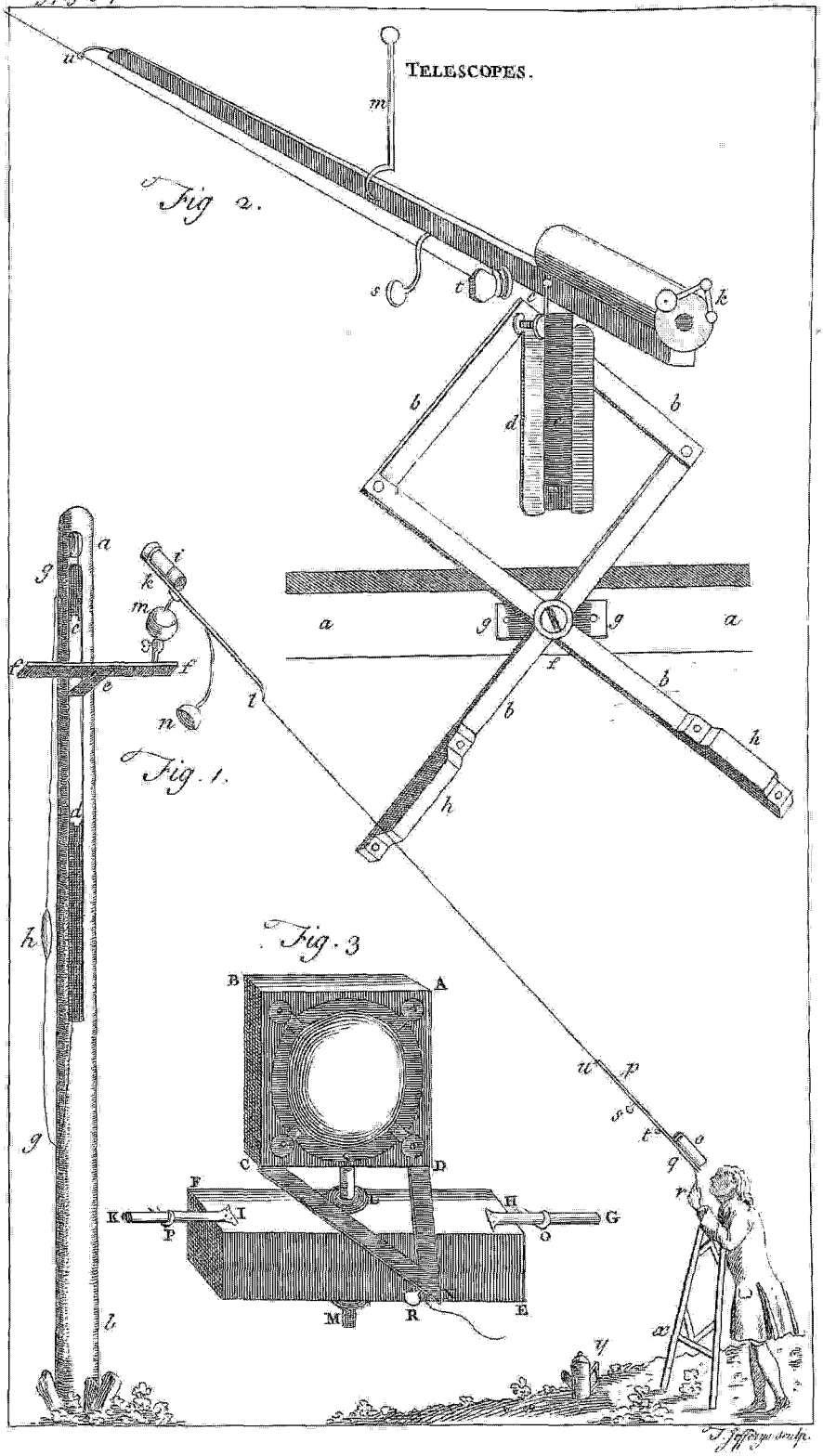
J. Jefferys sculp.

TELESCOPES.



Solar TELESCOPE. This inſtrument is applied to uſe in the following manner: AB (*ibid.* fig. 4.) repreſents a part of the window-ſhutter of a darkned room, CD the frame, which (by means of a ſcrew) contains the ſcioptric ball EF, placed in a hole of the ſaid ſhutter adapted to its ſize. This ball is perforated with a hole *abcd* through the middle; on the ſide *bc* is ſcrewed into the ſaid hole a piece of wood, and in that is ſcrewed the end of a common refracting teleſcope GH, IK, with its object-glaſs GH, and one eye-glaſs at IK; and the tube is drawn out to ſuch a length, as that the focus of each glaſs may fall near the ſame point.

This being done, the teleſcope and ball are moved about in ſuch a manner as to receive the ſun-beams perpendicularly on the lens GH, through the cylindric hole of the ball; by this glaſs they will be collected all in one circular ſpot *m*, which is the image of the ſun. The lens IK is to be moved nearer to or farther from the ſaid image *m*, as the diſtance at which the ſecondary image of the ſun is to be formed requires, which is done by ſliding the tube IKLM backwards and forwards in the tube LMNO. Then of the firſt image of the ſun *m* will be formed a ſecond image PQ, very large, luminous, and diſtinct.

In this manner the ſun's face is viewed at any time, without offence to weak eyes; and whatever changes happen therein, may be duly obſerved. The ſpots (which make ſo rare an appearance to the naked eye, or through a ſmall teleſcope in the common way) are here all of them conſpicuous, and eaſy to be obſerved under all their circumſtances of beginning to appear, increaſe, diviſion of one into many, the uniting of many into one, the magnitude, decreaſe, abolition, diſappearance behind the ſun's diſk, &c. By the ſolar teleſcope, we alſo view an eclipſe of the ſun to the beſt advantage, as having it in our power by this means to repreſent the ſun's face or diſk as large as we pleaſe, and conſequently the eclipſe proportionably conſpicuous. Alſo the circle of the ſun's diſk may be ſo divided by lines and circles drawn thereon, that the quantity of the eclipſe eſtimated in digits, may this way be moſt exactly determined: alſo the moments of the beginning, middle, and end thereof, for finding the longitude of the place: with ſeveral other things relating thereto. See FACULÆ, MACULÆ, ECLIPSE, LONGITUDE, &c.

The tranſits of mercury and venus over the face of the ſun, are exhibited moſt delightfully by this inſtrument. They will here appear truly round, well defined, and very black; their comparative diameters to that of the ſun may this way be obſerved, the direction of their motion, the times of their ingreſs and egreſs, with other particulars for determining the parallax and diſtance of the ſun, more nicely than has hitherto been done.

By the ſolar teleſcope, you ſee the clouds moſt beautifully paſs before the face of the ſun, exhibiting a curious ſpectacle according to their various degrees of rarity and denſity. But the beautiful colours of the clouds ſurrounding the ſun, and refracting his rays, are beſt ſeen in the picture made by the camera-glaſs. See the article CAMERA.

The fine azure of the ſky, the intenſely ſtrong and various dyes of the margins of clouds, the halo's and corona's, are this way inimitably expreſſed. And ſince the priſmatic colours of clouds, ſo variouſly compounded here, make ſo noble and delightful a phænomenon, it is ſurpriſing that no more regard is had thereto by painters, whoſe clouds (though near the ſun) are ſeldom or never ſeen tinged or variegated with thoſe natural tints and colours. See CLOUD, HALO and CORONA.

Aerial TELESCOPE, is a dioptric teleſcope, uſed without a tube, in a dark night; for the uſe of the tube is not only to direct the glaſſes, but alſo to make the place dark where the images of objects are formed.

Hugenius contrived a teleſcope of this kind for viewing the celeſtial bodies, by fixing the object-glaſs on the top of a long upright pole, and directing its axis towards any object by means of a ſilk line coming from the object-glaſs to the eye-glaſs below.

We ſhall here give the deſcription of one of theſe teleſcopes. On the top of a long pole, or maſt, *ab* (plate CCLXXIII. fig. 1.) is fixed a board moveable up and down in the channel *cd*: *e* is a perpendicular arm fixed to it, and *ff* is a tranſverſe board that ſupports the object-glaſs incloſed in the tube *i*, which is raiſed or lowered by means of the ſilk thread *rl*; *gg* is an endleſs rope, with a weight *h*, whereby the apparatus of the object-glaſs is counterpoiſed; *kl* is a ſtick faſtened to the tube *i*; *m* the ball and ſocket, by

means of which the object-glaſs is moveable every way; and to keep it ſteady there is added a weight *n* ſuſpended by a wire; *l* is a ſhort wire, to which the thread *r l* is tied; *o* is the tube which holds the eye-glaſs; *q* the ſtick fixed to this tube, *s* a leaden bullet, and *t* a ſpool to wind the thread on; *u* is pins for the thread to paſs through; *x* the reſt for the obſerver to lean upon; and *y* the lantern. In this manner, teleſcopes have been conſtructed 123 feet long.

There are ſeveral ways of preparing a pole of a proper height, which every workman can readily employ. But as unexperienced perſons cannot eaſily find out and follow an object with this ſort of teleſcope, we ſhall ſhew how this may be done by means of a ſmall machine placed upon a reſt *a a* (*ibid.* fig. 2.) and a variable rhombus made of braſs plates *b b*, two of whoſe ſides are produced, till they equal the ſides of the rhombus, which is fixed at *g g* to the reſt. From the upper angle of the rhombus, there projects a ſmall axis about half an inch: on this axis is fixed the plate *e*, which upon a very ſmall axis ſupports the ſtick and tube of the eye-glaſs; and the whole is counterpoiſed upon the axis *f* by proper weights *h*, *h*. Things being thus ordered, to whatever place the obſerver ſhall move the object-glaſs, by the handle *d*, there it will remain at reſt.

And for managing the object-glaſs, M. de la Hire contrived the machine repreſented, *ibid.* fig. 3. where E F is an oblong piece of wood, of a convenient magnitude, to the ends of which are fixed two cylindrical ſtaves G H, I K, to ſerve as an axis; then a hole is bored in a line with this axis, for the wooden axis S L M to paſs through, with two nuts S, M. To the upper end, S, is fixed a ſquare board A C, with a circular pole in it to receive the object-glaſs; and to the bottom corners of this board are fixed two wooden rulers, which meet at N, where there is a pin, R; to which the ſilk-thread for moving the object-glaſs is tied, as much below the line C D as the axis G K, which lies upon two tenter-hooks O, P. To keep off the dew from the object-glaſs, the ſame gentleman orders it to be included in a paſteboard-tube, made of ſpungy paper, to ſuck up the humidity of the air: and to find an object more readily, he preſcribes a broad annulus of white paſteboard to be put over the tube that carries the eye-glaſs; upon which the image of the object being painted, an aſſiſtant, that ſees it, may direct the tube of the eye-glaſs into its place: or, that the obſerver himſelf may ſee it, he would have it received upon a ring of tranſparent oiled paper, paſted upon a circular frame inſtead of paſteboard.

TELESCOPE-SHELL, in ichthyology, the conic turbo, with plane, ſtriated, and very numerous ſpires. See TURBO.

Tubes for TELESCOPES. See TUBE.

TELESIN, a province of the kingdom of Algiers, in Africa, ſituated on the confines of the empire of Morocco.

TELGA, a city of Sweden, in the province of Sunderland, ſituated on the ſouth-ſide of the Meller-lake, twenty miles ſouth-weſt of Stockholm.

TELLER, an officer of the exchequer, in antient records called tallier; there are four of theſe officers, whoſe duty is to receive all ſums due to the king, and to give the clerk of the pells a bill to charge him therewith. They likewiſe pay all money due from the king, by warrant from the auditor of the receipt, and make weekly and yearly books, both of their receipts and payments, which they deliver to the lord treaſurer.

TELLONIUM. See THELONIUM.

TELLICHERRY, a port town on the Malabar coaſt, in the hither India, thirty miles north of Callicut: eaſt long. 75° north lat. 12°.

TELLINA, in ichthyology, a name given to thoſe ſpecies of muſcles, which have equal extremities, and are of an oblong plane figure. See the article MYTULUS.

TELLUS. See the article EARTH.

TEMESWAER, the capital city of the Bannat of Temeſwaer, lately annexed to Hungary, ſixty miles north-eaſt of Belgrade: eaſt long. 22°, north lat. 45° 55′.

TEMPERAMENT, among phyſicians, denotes the ſame with conſtitution; or a certain habitude of the humours of the human body, whereby it may be denominated hot, cold, moiſt, dry, bilious, ſanguine, phlegmatic, melancholic, &c. See the article CONSTITUTION.

According to Boerhaave, moiſtening, diluting, and temperating ſubſtances, are a proper diet for perſons of a hot and acrid temperament; and, on the contrary, all heating things are prejudicial to them: whereas, in perſons of a cold and moiſt habit, juſt the reverſe of this obtains. To perſons of a ſanguineous temperament, evacuating and temperating medicines

medicines are beneficial, and heating or drastic stimulating things pernicious. Persons of a melancholy temperament are greatly injured by hot, drying, and acrid substances; whereas moistening, refrigerating, relaxing, emollient substances, and such as gently dissolve without any acrimony, are beneficial to them.

TEMPERAMENT in music, is the rectifying or mending the imperfect concords, by transferring to them part of the beauties of the perfect ones. See the articles CONCORD and INTERVAL.

In order to this, musicians take a medium between the two, which they call a temperament. Supposing then, one tone increased, and the others diminished, by half a comma, we should have our thirds major perfect: but still, it is necessary to examine, what fifths this supposition would give. Now it is evident, that a tone-major added to an octave, makes just too fifths, thus $\frac{2}{1} \times \frac{9}{8} = \frac{9}{4} = \frac{3}{2} \times \frac{3}{2}$. But the tone here added is a tone major, and the tone we have assumed is a temperate tone, deficient from the tone major by half a comma; hence the sum of the two fifths, on this supposition, will fall short of the truth by $\frac{1}{2}$ of a comma, and consequently one fifth will be deficient by $\frac{1}{4}$ of a comma. Which difference, although it be sensible, yet experience shews, that fifths so diminished are tolerable.

This is what is called the common or vulgar temperament, and consists, as has been said, in diminishing the fifth by $\frac{1}{4}$ of a comma, in preserving the third major perfect, and dividing it into two equal tones. Which being supposed, it follows that the fourth must exceed the truth by $\frac{1}{4}$ of a comma; that the third minor will be deficient by the same quantity; that the sixth minor will be perfect, and the sixth major redundant by $\frac{1}{4}$ of a comma; and lastly, that the semitone major will exceed the truth by $\frac{1}{4}$ of a comma. If we introduce chromatic notes, or flats and sharps, the semitone minor will also exceed the truth by $\frac{1}{2}$ of a comma, and consequently the difference between the two semitones, or the diesis enharmonica, will be preserved.

There are also other temperaments proposed by different authors; as that of 31 parts by Mr. Huygens; Mr. Sauver's of 43, Mr. Henfling's of 50, and that of 12.

TEMPERING *of steel and iron*, the rendering them either more compact and hard, or soft and pliant, according as the different uses for which they are wanted may require. See IRON and STEEL.

This operation consists in plunging them, while red-hot, into some liquor prepared for the purpose; sometimes in pure water, as locksmiths, *&c.* which seldom use any other: and sometimes a composition of divers juices, liquors, *&c.* is used; which is various according to the manner and experience of the workman; as vinegar, mouse-ear water, the water oozing from broken glasses, soot, salt, oil, *&c.* To harden and temper english, flemish, and swedish steel, they must have a pretty high heat given them, and then be suddenly quenched in water to make them hard: but spanish and venetian steel will require no more than a blood-red heat before it is quenched.

If the steel be too hard or brittle for an edged tool, *&c.* take it down by rubbing a piece of grind stone or whet-stone hard upon the work, to take off the black scurf; then brighten or heat it in the fire, and as it grows hotter, you will see the colour change by degrees, coming first to a straw or light gold-colour, then to a darker gold-colour, and at last to a blue colour.

Choose such of these colours as the work requires, then quench it suddenly in the water. The light-gold colour is for files, cold chissels, and punches to punch iron and steel: the dark gold-colour, for punches to use on brass, *&c.* the blue colour gives the temper for springs.

The tempering of files and needles is performed after a peculiar manner.

The antients appear to have had some better method of tempering, than any of the moderns are acquainted withal; witness their works in porphyry, a stone so hard, that none of our tools make an impression upon it.

TEMPLARS, or TEMPLERS, a religious order instituted at Jerusalem, about the year 1118. Some religious gentlemen put themselves under the government of the patriarch of Jerusalem, renounced property, made the vow of celibacy and obedience, and lived like canons regular. King Baldwin assigned them an apartment in his palace. They had likewise lands given them by the king, the patriarch, and the nobility, for their maintenance. At first there were but nine of this order, and the two principal persons were Hugo de Paganis, and Geoffry of St. Omers. About nine

years after their inſtitution, a rule was drawn up for them, and a white habit aſſigned them, by pope Honorius II. About twenty years afterwards, in the popedom of Eugenius III. they had red croſſes ſewed upon their cloaks, as a mark of diſtinction; and in a ſhort time they were increaſed to about three hundred, in their convent at Jeruſalem. They took the name of Knights Templars, becauſe their firſt houſe ſtood near the temple dedicated to our Saviour, at Jeruſalem. This order, after having performed many great exploits againſt the infidels, became rich and powerful all over Europe; but the knights, abuſing their wealth and credit, fell into great diſorders and irregularities. Many crimes and enormities being alledged againſt them, they were proſecuted in France, Italy and Spain; and at laſt, the pope, by his bull of the 22d of May, 1312, given in the council of Vienna, pronounced the extinction of the order of Templars, and united their eſtates to the order of St. John of Jeruſalem.

TEMPLE, a general name for places of public worſhip, whether pagan, chriſtian, or otherwiſe. But the word, in a reſtrained ſenſe, is uſed to denote the places, or edifices, in which the pagans offered ſacrifice to their falſe gods. Thus we hear of the Temples of Jupiter, Apollo, Bacchus, &c. They were built and adorned with all poſſible ſplendor and magnificence, partly out of reſpect to the gods, and partly to create an awe and reverence in the worſhippers. They were conſtructed in the manner which was thought moſt agreeable to the gods, to whom they were dedicated. Thus Jupiter, they thought, took moſt delight in pillars of the doric order; Bacchus in the ionic; and Veſta in the corinthian: this rule, however, was not univerſally or conſtantly obſerved. Temples were divided into two parts; the one called Adytum, which was the inmoſt receſs of the building, and deemed ſo ſacred, that none but the prieſts were allowed to enter into it; the other was open, and free to all, who came to pay worſhip. In the middle of the temples ſtood the images of the gods, on pedeſtals, raiſed above the height of the altar, and incloſed with rails.

Temples, according to the number and difference of their columns, were divided into tetraſtyle, proſtyle, amphiproſtyle, periptere, diptere, pſeudo-diptere, hypæthros, and monoptere, temples. See TETRASTYLE, &c.

TEMPLES, in anatomy, a double part of the head, reaching from the forehead and eyes to the two ears. See HEAD.

TEMPORAL, a term generally uſed for ſecular, as a diſtinction from eccleſiaſtical. Thus we ſay temporal lords, and ſpiritual or eccleſiaſtical lords.

TEMPORALIS, in anatomy. See the article CROTAPHITES.

TEMPORALITIES, the temporal revenues of an eccleſiaſtic, ſuch as have been annexed to biſhops-ſees by kings, and other great perſonages of this land, as they are barons and lords of parliament, ſuch as manors, lands, and lay fees.

TEMPORUM OSSA. See the article PETROSA OSSA.

TENAILLE, in fortification, a kind of outwork, reſembling a horn-work, but generally ſomewhat different, for inſtead of two demi-baſtions, it bears only in front a re-entring angle betwixt the ſame wings without flanks; and the ſides are parallel. See the articles FORTIFICATION and HORN-WORK.

Tenaille double or flanked, is a work, whoſe front conſiſts of four faces, making two re-entring angles, and three ſaliant; the wings or ſides of this work being in like manner correſpondent in the front of the gorge. See the article GORGE.

Tenaille ſimple, a work having its front formed by two faces, which make a re-entring angle, the ſides running directly parallel from the head to the gorge.

Tenaille of the place, is that which is comprehended between the points of two neighbouring baſtions; that is to ſay, the curtain, the two flanks that are raiſed on the curtain, and the two ſides of the baſtions which face one another; ſo that it is the ſame with what is otherwiſe called the face of the fortreſs. See the article BASTION, &c.

Tenaille of the foſs, is a low work raiſed before the curtain in the middle of the foſs: it is of three ſorts; the firſt is compoſed of a curtain, two flanks and two faces; the rampart of the curtain, including the parapet and talus, is but five fathom thick, but the rampart of the flanks and faces is ſeven. The ſecond is compoſed only of two faces made on the lines of defence, whoſe rampart and faces are parallel. The third ſort differs from the ſecond, only in this, that its rampart is parallel to the curtain of the place. All three ſorts are good, and cannot be

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hurt by the beſiegers cannon, till they are maſters of the covert way, and have planted their canon there. See FOSS.

All tenailles are defective in this reſpect, that they are not flanked or defended towards their inward or dead angle; becauſe the height of the parapet hinders ſeeing down before the angle, ſo that the enemy can lodge himſelf there under covert: wherefore tenailles are never made but when they want time to make a horn-work.

TENANT, one that holds lands or tenements of ſome lord, or landlord, by rent, fealty, &c. There are ſeveral ſorts of tenants, as tenants in fee, tail, for life, years, or at will. There are alſo joint-tenants, tenants in common. See the article JOINT-TENANT, &c.

Tenant to the præcipe, is the perſon againſt whom the writ of præcipe is to be brought in ſuing out a common recovery. See the article PRÆCIPE.

TENANT, or TENAN, in heraldry. See the article SUPPORTER.

TENAR, in anatomy. See THENAR.

TENBURY, a market-town of Worceſterſhire, fifteen miles north-weſt of Worceſter.

TENBY, a port-town of Pembrokeſhire, ſituated on Briſtol channel: weſt long. 4° 45′, north lat. 51° 40′.

TENCH, in ichthyology, the engliſh name of a ſpecies of the cyprinus, of a purpliſh black colour; with an even tail; its length is generally about ten or eleven inches, its breadth about three, and its thickneſs more than two; but it ſometimes grows to an immoderate large ſize. See the article CYPRINUS.

For the method of fiſhing for tench. See the article FISHING.

TENDE, a town of Piedmont, in Italy, twenty-five miles north-eaſt of Nice.

TENDER, in law, ſignifies carefully to offer, or circumſpectly endeavour the performance of a thing; as to tender rent is to offer it at the time and place when and where it ought to be paid, which is done to ſave the penalty of a bond or obligation, before action is brought thereon. A tender of rent on any part of the land occupied, or at any time of the laſt day of payment, will ſave the proviſo, or condition for that time, whether the landlord does accept of it or not; and yet though the rent be duly tendered, the landlord may afterwards bring action of debt; but he cannot recover any damages, for in that caſe the tenant's tender excuſes the damages, but does not debar the landlord of his rent: but it muſt be obſerved, that a tender of rent made to ſave forfeiture, muſt be of the whole rent due without any deduction, on account of the taxes, &c. unleſs it be ſo agreed betwixt the landlord and tenant; for ſtoppage is no payment in law. Where a tender is of money due on a bond, it muſt be made to the perſon of the obligee on the day appointed; nevertheleſs, if the obligor be afterwards ſued, he muſt ſtill pay the money.

TENDER, a ſmall ſhip, in the ſervice of men of war, for carrying of men, proviſions, or any thing elſe that is neceſſary.

TENDONS, are white, firm, and tenacious parts, continuous to the muſcles, and uſually forming their extremities. When the fibres of which they are compoſed, expand themſelves into a membrane, they are called Aponeuroſes. See the article MUSCLE.

Tendo Achillis, is a large tendon, formed by the union of the tendons of the four exterior muſcles of the foot; it is ſo called, becauſe the fatal wound whereby Achilles is ſaid to have been ſlain, was given there.

TENEBRÆ, an office in the romiſh church, performed on Wedneſday Thurſday, and Friday, in Paſſion Week, at which time, neither flowers nor images are allowed to be ſet upon the altars, but they muſt be covered with purple.

TENEBRIO, *the ſtinking beetle*, in natural hiſtory, a genus of inſects, the antennæ of which are ſlender, oblong, and filiform; the elytra are joined together, and there are no interior wings.

TENEDOS, one of the ſmalleſt iſlands of the Archipelago, ſituated near the coaſt of leſſer Aſia, weſt of the ruins of Troy, eaſt long. 27°, north lat. 39° 30′.

TENEMENT, properly ſignifies a houſe; but in a larger ſenſe it is taken for any houſe, land, rent, or other thing, which a perſon holds of another.

TENEMENTARY LANDS, ſuch as are held by the tenant, diſtinguiſhed by that name from the demeſne land of the lord, called inland.

TENEMENTIS LEGATIS, a writ that antiently lay to the city of London, or any other corporation, where, according to the old cuſtom, men might deviſe tenements, as well as goods and chattels,

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by their laſt will, for the determining of any controverſy relating thereto, and for rectifying the wrong tenant.

TENENTIBUS IN ASSISA NON ONERANDIS, a writ which lies for the perſon to whom a diſſeiſor has aliened the land, whereof he diſſeiſed another; that he be not arreſted for the damages awarded on the aſſize, if the diſſeiſor has wherewith to ſatisfy them himſelf.

TENERIF, one of the largeſt of the Canary Iſlands, ſituated in the Atlantic Ocean: weſt long. 17°, north lat. 28°, being about 120 miles in circumference. It is a fruitful iſland, abounding in corn, wine and oil, though pretty much incumbered with mountains, of which the moſt remarkable is that called the pico of Tenerif, being one of the higheſt mountains in the world, in the form of a ſugar-loaf, the white top whereof may be ſeen at ſea, upwards of one hundred miles.

TENES, a province of the kingdom of Algiers, in Africa.

TENESMUS, in medicine, a name given by medical writers, to a complaint which is a continual deſire of going to ſtool, but without any ſtool being ready to be voided. This is uſually attended with ſome tumour, ſometimes with a very conſiderable one in the part. This is properly no primary diſeaſe, but merely a ſymptomatic one, and differs in degree according to the diſeaſe on which it is an attendant. Signs of it are a titillation and itching about the anus, attended with a violent burning pain, and a deſire of compreſſing and voiding ſomething, and this attended uſually with no excrement, or only a pulpous or mucous matter, and very often a prolapſus ani, or falling down of the rectum. This diſeaſe happens often to people labouring under hæmorrhoidal diſorders, eſpecially when the diſcharges attending them do not ſucceed regularly, though nature gives all the neceſſary motions for their excretion. It happens alſo to people who are ſubject to void an acrid and bilious matter by ſtool, and not unfrequently to thoſe who have a ſtone in the bladder. Women in the latter part of their time in going with child, have alſo very often terrible fits of it, attended with conſiderable ſwelling; this happens to them from the preſſing of the uterus, with its burden, upon the rectum and hæmorrhoidal veins. The cauſes of a teneſmus, beſides thoſe already mentioned, are the aſcarides, a ſmall ſort of worms, which uſually infeſt the rectum, and occaſion a continual itching and tickling there; the abuſe of reſinous purging medicines. Much riding will alſo ſometimes occaſion it. See PROLAPSUS, HÆMORRHOID, &c.

As the teneſmus is merely a ſymptomatic diſeaſe, the primary diſorder is firſt to be examined, and treated in order to a cure; thus, when it is occaſioned by aſcarides, worm medicines are to be given, and clyſters of a proper kind injected; and when the worms are by this means deſtroyed, the teneſmus, which was no more than a ſymptom, naturally ceaſes. In general, the regimen and method of cure proper in a teneſmus, are the ſame with thoſe preſcribed in a dyſentery; great relief is afforded by a fomentation of warm milk, in which elder flowers have been boiled, as alſo by a clyſter of mutton-broth, or an emollient clyſter, in which earth-worms have been boiled. The medicines, at preſent, generally uſed for the cure of a teneſmus, are theſe following: Take of pulvis ſanctus and rhubarb, each one ſcruple; of the oil of cinnamon, one drop; of london laudanum, half a grain; and of the ſyrup of violets, a ſufficient quantity for making into a bolus, to be taken in the morning, and repeated as the ſituation of the patient requires; at night, a paregoric may be exhibited, and clyſters afterwards uſed; for which purpoſe, take of whey, or mutton-broth, four ounces; of canary wine, two ounces; of gum arabic, half an ounce; of gum tragacanth, one dram; and of crude opium, two grains; make into a clyſter, to be injected twice or thrice a day, afterwards continue the following medicine for ſome time: Take of the confection of Fracaſtorius, without honey, one ſcruple; of ſperma ceti, fifteen grains; of the ſpecies hyacinthæ, japan earth, red coral, and american bole, each eight grains; of the oil of nutmegs, one drop; and ſyrup of red roſes, a ſufficient quantity for making a bolus, to be taken twice a day, in a ſmall quantity of the tincture of red roſes. In a teneſmus, the laſt refuge is to opiates.

TENET, or TENENT, a particular opinion, dogma, or doctrine, profeſſed by ſome divine, philoſopher, &c.

TENNE, TENNY, or TAWNY, in heraldry, a bright colour made of red and yellow mixed; ſometimes alſo called bruſk, and expreſſed in engraving, by thwart, or diagonal ſtrokes or hatches, begin-

beginning from the ſiniſter chief, like purpure, and marked with the letter T. In the coats of all below the degree of nobles, it is called tenny; but in thoſe of nobles, it is called hyacinth; and in princes coats, the dragon's head. See plate CCLXXIV. fig. 3.

TENON, in building, *&c.* the ſquare end of a piece of wood, or metal, diminiſhed by one third of its thickneſs, to be received into an hole in another piece, called a mortiſe, for the jointing or faſtening the two together. It is made in various forms, ſquare, dove-tailed for double mortiſes, and the like.

TENOR, or TENOUR, the purport or content of a writing or inſtrument in law, *&c.* An action of debt brought upon a judgment in an inferior court, where the defendant pleads, *nul tiel record*, no ſuch record, a tenor thereof only ſhall be certified; and it likewiſe is the ſame on certioraris. A tenor of a libel has been held to be a tranſcript of it.

TENOR, or TENORE, in muſic, the firſt mean, or middle part, or that which is the ordinary pitch of the voice, when neither raiſed to a treble, or lowered to a baſs. The tenor is commonly marked in thorough baſs with the letter T. This is that part which almoſt all grown perſons can ſing; but as ſome have a greater compaſs of voice upwards, others downwards, others are confined to a kind of medium, and others can go equally high or low; hence muſicians make a variety of tenors, as a low, a high, a mean, a natural tenor, to which may be added, a violin tenor, *&c.* for inſtruments. The Italians uſually diſtinguiſh two kinds of tenor, *tenore primo*, or 1° or P°, which anſwers to our upper tenor; and *tenore ſecundo*, 2°, or II°, which is our natural tenor, confounding the counter tenors, *&c.* under the name of baritono. See the article BARITONO, *&c.*

TENOR, or TENORISTA, is alſo uſed for a perſon who ſings the tenor part in concert alſo, for any inſtrument proper to play it.

TENORE INDICTAMENTI MITTENDO, in law, a writ for the removing of a record of an indictment, and the proceſs thereon out of another court, into the king's-bench. It is uſual in theſe caſes to certify the record itſelf, except it be from London, by virtue of the city charter.

TENORE PRESENTIUM, *by the tenor of theſe preſents*, in law, is taken for the ſubſtance, true intent and meaning of a deed, or other writing. See DEED, *&c.*

TENSE, TIME, in grammar, an inflection of verbs, whereby they are made to ſignify, or diſtinguiſh the circumſtance of time, in what they affirm. See VERB.

There are only three ſimple tenſes or times; the preſent, as *amo, I love*; the preterit, as *amavi, I have loved*; and the future, as *amabo, I ſhall* or *will love*. See PRESENT, *&c.*

But, as in the preterit, one may ſay, that the thing is but juſt now done; or indefinitely, that it was done; hence, in moſt languages, there are two ſorts of preterits or paſt tenſes; the one definite, which marks the thing to be preciſely done, as *I have ſaid, I have done, I have dined*; the other ſignifies it done indeterminately, and is for that reaſon called indefinite, or aoriſt, as *I wrote, I went, &c.* See AORIST, IMPERFECT, PLUSQUAMPERFECT, *&c.*

TENT, in ſurgery, a roll of lint worked into the ſhape of a nail, with a broad flat head. Tents differ in thickneſs and length, according to the ſize of the wound for which they are intended, as appears by the figures in plate CCLXXIV. fig. 1. at the letters K, L, M, N. Theſe tents are chiefly uſed in deep wounds and ulcers. They are of ſervice, not only in conveying medicines to the moſt intimate receſſes and ſinuſes of the wound, but to prevent the lips of the wound from uniting, before it is healed from the bottom; and by their aſſiſtance grumous blood, ſordes, *&c.* are readily evacuated. They ought to be made extremely ſoft, that the cure of the wound may not be retarded by the pain they would otherwiſe bring on.

There is another kind of tents, made of linnen rags not ſcraped, and worked up into a conical form, to the baſis of which is faſtened a long thread; the apex of this tent muſt be a little unravelled, to make it ſofter, leſt it may become painful: the thread is faſtened to the baſis, that the tent may be recovered with the greater eaſe, if, by any accident, it ſhould be forced into the cavity of the thorax or abdomen (*ibid.* letter O); for the tents we now deſcribe, are chiefly uſed to keep open wounds that penetrate into the cavity of the thorax or abdomen, in order to make way for the proper diſcharge of blood, matter, *&c.*

There is a third ſort of tents, which ſerve not only to keep open, but to enlarge, by degrees, the mouth of any wound or ulcer, which ſhall be thought too ſtrait; that,

that, by this means, a free paſſage may be procured for the blood and matter that were confined, and that proper medicines may find a more ready admittance. Theſe tents are made either of ſponge, prepared in a certain manner; or of dried roots of gentian, calamus aromaticus, &c. for their ſubſtances imbibe the matter which flows to them, and being preſently enlarged, dilate the lips of the wound.

TENTER, a machine uſed in the cloth manufacture, to ſtretch out the pieces of cloth, ſtuff, &c. or only to make them even, and ſet them ſquare.

It is uſually about four feet and a half high, and, for length, exceeds that of the longeſt piece of cloth. It conſiſts of ſeveral long pieces of wood, placed like thoſe which form the barriers of a manege; ſo that the lower croſs-piece of wood may be raiſed or lowered, as is found requiſite, to be fixed at any height, by means of pins. Along the croſs-pieces, both the upper and under one, are hooked nails, called tenter-hooks, driven in from ſpace to ſpace.

TENTERDEN, a market-town of Kent, twenty miles ſouth-weſt of Canterbury.

TENTHREDO, in natural hiſtory, a genus of the hymenoptera claſs of inſects, the female having a ſerrated point or weapon at the tail: the worm produced of the egg has ſeveral feet. The ſpecies of this genus have been generally confounded with the ichneumon. See the article ICHNEUMON.

TENURE, in law, ſignifies the manner whereby lands or tenements are held, or the ſervice that the tenant owes to his lord: it likewiſe denotes the eſtate in the land. Tenures were antiently divided into the following: eſcuage; that is, land held by the ſervice of the ſhield, and thereby the tenant was, at his own expence, obliged to follow his lord into the wars. Knight's ſervice and chivalry; when lands were held of the king, or meſne-lord, to perform ſervice in war. Burgage tenure; land held of the lord of the borough, at a certain rent. Villenage, otherwiſe termed baſe-tenure; whereby the tenant was bound to do all inferior ſervices, commanded by the lord. Grand-ſerjeanty; lands held by honorary ſervices at the king's coronation. Petit-ſerjeanty; lands held of the king, to contribute yearly ſome ſmall thing towards his wars. Frankalmoine; that tenure by which lands were held by eccleſiaſtics, in free and perpetual alms. Socage-tenure; where lands are held by tenants, to plow their lord's land, and perform other offices of huſbandry, at their own expence. But all theſe antient tenures and ſervices are, in general, taken away, and reduced into common and free-ſocage. The uſual tenures at preſent are, fee-ſimple; which is an abſolute tenure of lands to a man and his heirs for ever. Fee-tail; a limited fee, to a perſon and the heirs of his body begotten. Curteſy-tenure; where a man having married a woman ſeiſed in fee, &c. has iſſue born alive by her, in which caſe, after her death, the huſband is tenant by the curteſy of England. Tenure in dower; is where a widow holds, for her life, a third part of her huſband's land, whereof he was ſeiſed in fee at any time during the coverture. There is alſo a tenure for life, or years, when lands are held for thoſe terms on reſerved rents. Copyhold-tenure, is a holding for lives, or in fee, at the will of the lord, according to the cuſtom of the manor.

TEPID, a term uſed by writers on mineral waters, &c. to expreſs ſuch of them as have a leſs ſenſible cold than common water. See MINERAL WATER.

TERAMO, a town of Italy, in the kingdom of Naples, and territory of Abruzzo, forty-two miles ſouth of Loretto: eaſt longit. 15°, and north lat. 42° 40'.

TERCERA, one of the largeſt of the Azores or Weſtern-iſlands, ſituated in the Atlantic ocean: weſt lon. 28°, and north lat. 39°.

TEREBINTHUS, the TURPENTINE-TREE. See the article TURPENTINE.

TERES, in anatomy, a name given to two muſcles of the arm; one is called teres major, and is one of the depreſſor muſcles, which has its origin at the lower angle of the ſcapula, and its termination three fingers below the head of the humerus: the other is called teres minor, being one of the abductor-muſcles, and having its origin at the inferior coſta of the ſcapula; this, together with the infraſpinatus, properly forms one conjunct muſcle, having, at the extremity, only a ſingle tendon, which is inſerted into the poſterior part of the neck of the humerus.

TERGIFOETUS PLANTS, ſuch as bear their ſeeds on the backſides of their leaves: ſuch are all the capillary plants.

TERGOWISCO, the capital of Wallachia, in european Turky, eighty miles ſouth-eaſt of Hermanſtat in Tranſilvania: eaſt long. 26° 30', north lat. 45° 35'.

TERKI, a port-town of Circaſſia, in Aſia, ſituated on a river of the ſame name, near the Caſpian ſea: eaſt lon. 52°, and north lat. 43° 40′.

TERM, *terminus*, in general, ſignifies much the ſame with boundary or limit. See BOUNDARY and LIMIT.

TERM, in law, is generally taken for a limitation of time or eſtate; as a leaſe for term of life, or years, which is deemed a chattel real. See CHATTEL.

Term, however, is more particularly uſed for that time wherein our courts of juſtice are open; in oppoſition to which, the reſt of the year is called vacation. There are four of theſe terms in a year, *viz.* 1. Hilary-term, which begins on Jan. 23. but if that is a Sunday, the next day, and ends on Feb. 12. 2. Eaſter-term, which begins the Wedneſday fortnight after Eaſter-day, and ends the Monday next after Aſcenſion-day. 3. Trinity-term, which begins on the firſt Friday after Trinity-ſunday, and ends the Wedneſday fortnight after. 4. Michaelmas-term, which begins on Nov. 6. and ends the 28th of the ſame month.

It has been held, that courts do not ſit except in term-time, as to giving of judgments, *&c.* and in every term there are four days, thus diſtinguiſhed; that is, the eſſoin-day, the day of exceptions, the day of return of writs, and day of appearance. On the eſſoin-day the term is ſaid to begin, when one judge ſits in each of the courts of Weſtminſter, in order to take and enter eſſoins: but it is not till three days afterwards, that all the judges ſit for the diſpatch of buſineſs. There are likewiſe different returns in different terms, ſome having more, ſome fewer: and as, in the king's bench, all returns are to be made on ſome particular day of the week in each term, care muſt be taken not to make the writs out of that court, returnable on a non-judicial day, as Sunday, All-ſaints, *&c.* See RETURN.

Oxford-TERMS. Hilary, or lent-term, begins on Jan. 14. and ends the Saturday before Palm-ſunday. Eaſter-term begins the tenth day after Eaſter, and ends the Thurſday before Whit-ſunday. Trinity-term begins the Wedneſday after Trinity-ſunday, and ends after the act, ſooner or later, as the vice-chancellor and convocation pleaſe. Michaelmas-term begins on Oct. 10. and ends Dec. 17.

Cambridge TERMS. Lent-term begins on Jan. 13. and ends the Friday before Palm-ſunday. Eaſter term begins the Wedneſday after Eaſter-week, and ends the week before Whit ſunday. Trinity-term begins the Wedneſay after Trinity-ſunday, and ends the Friday after the commencement. Michaelmas-term begins Oct. 10. and ends Dec. 16.

Scottiſh TERMS. In Scotland, Candlemas-term begins Jan. 23. and ends Feb. 12. Whitſuntide-term begins May 25. and ends June 15. Lammas-term begins July 20. and ends Aug. 8. Martinmas-term begins Nov. 3. and ends Nov. 29.

TERM, in grammar, denotes ſome word or expreſſion of a language.

TERM *in the arts*, or TERM *of art*, is a word which, beſides the literal and popular meaning which it has, or may have, in common language, bears a further and peculiar meaning in ſome art or ſcience.

TERM, in logic. A propoſition is ſaid to conſiſt of two terms, *i. e.* two principal and eſſential words, the ſubject, and the attribute. See PROPOSITION.

TERMS *of an equation*, in algebra, are the ſeveral names or members, of which it is compoſed, and ſuch as have the ſame unknown letter, but in different powers or degrees: for if the ſame unknown letter be found in ſeveral members in the ſame degree or power, they ſhall paſs but for one term.

As, in this equation, $xx+ax=bb$; the three terms are xx, ax, and bb.

Moreover, in this, $x^4+x^3+x^2+\frac{a^2b}{cd}x+\frac{fp}{rs}x+yy=0$; the terms are x^4, x^3, x^2, $\frac{ab}{cd}+\frac{fp}{rs}\times x$, and yy. Where $\frac{ab}{cd}x$, and $\frac{fp}{rs}x$, are the ſame terms; and the firſt term in any equation muſt be that where the unknown root hath the higheſt dimenſions; and that term which hath the root in it, of one dimenſion of power lower, is called the ſecond term, and ſo on.

TERMS *of proportion*, in mathematics, are ſuch numbers, letters, or quantities, as are compared one with another.

Thus, if $2.4::8:16$ / $a.b::c:d$, then a, b, c, d, or 2, 4, 8, 16, are called the terms; a being the firſt term, b the ſecond term, *&c.*

TERMS, or COURSES, in medicine, the menſes, or women's monthly purgations. See the articles MENSES.

TERMINALIA, in antiquity, feaſts celebrated by the Romans, in honour of the god Terminus.

Varro is of opinion this feaſt took its name from its being at the term or end of the year: but Feſtus is of a different ſentiment, and derives it from the name of the deity in whoſe honour it was held.

TERMINATION, *terminatio*, in grammar, the ending of a word, or laſt ſyllable thereof. See WORD and SYLLABLE. It is the different termination of one and the ſame words on different occaſions, that conſtitute the different caſes, numbers, tenſes, and moods, *&c.* See CASE, NUMBER, *&c.*

TERMINI, or TERMOLE, a town of the province of Capitanate, in the kingdom of Naples, ſeventy miles north-eaſt of the city of Naples.

TERNATE, the moſt northerly of the Molucca or Clove-iſlands, in the poſſeſſion of the Dutch.

TERNATEA, in botany, a plant, otherwiſe called clitoria. See CLITORIA.

TERNI, a town of Italy, ſubject to the pope, forty-ſix miles north-eaſt of Rome.

TERRA, EARTH, in geography and aſtronomy. See the article EARTH.

TERRA FIRMA, in geography, is ſometimes uſed for a continent, in contradiſtinction to iſlands.

Thus Aſia, the Indies, and ſouth America, are uſually diſtinguiſhed into terra firmas and iſlands.

TERRA A TERRA. Gallies, and other veſſels are ſaid to go terra a terra, when they never go far from the coaſts.

The phraſe is alſo applied, in the manege, to horſes which neither make curvets nor balotades, but run ſmoothly on the ground, on a preſſed gallop, only making little leaps or riſings with the fore feet.

TERRA DEL FOGO, an iſland of ſouth America, from which it is ſeparated by the ſtreights of Magellan.

TERRÆ FILIUS, SON OF THE EARTH, a ſtudent of the univerſity of Oxford, formerly appointed, in public acts, to make jeſting and ſatyrical ſpeeches againſt the members thereof, to tax them with any growing corruptions, *&c.*

TERRACE, or TERRAS, a walk or bank of earth, raiſed in a garden or court, to a due elevation, for a proſpect.

TERRACE is alſo applied to the roofs of houſes that are flat, and whereon one may walk; as alſo to balconies that project.

TERRACINA, a town of the Campania of Rome, in Italy, ſeventeen miles north-weſt of Gaieta.

TERRAQUEOUS, in geography, an appellation given to our globe, becauſe conſiſting of land and water. See the articles EARTH and SEA.

TERRE-PLEIN, in fortification, denotes the horizontal ſuperficies, or top, of the rampart, between the inferior talus and the banquette. It is thus called, as lying nearly level, with only a little ſlope inwardly, to bear the recoil of the cannon. See RAMPART.

TERRE-TENANT, in law, the perſon who hath the actual poſſeſſion of the land: thus, if a freeholder lets out his freehold to another, to be poſſeſſed and occupied by him, this perſon is called the terre-tenant. See the article TENANT.

TERRELLA, *μικρὸν*, an appellation given to a load-ſtone, when turned into a ſpherical figure, and is placed ſo, that its poles and equator, *&c.* correſpond to the poles and equator of the world; as being a juſt repreſentation of the great magnetical globe which we inhabit. See the article MAGNET.

Such a terrella, if nicely poiſed and placed in a meridian, it was imagined, would turn about its axis once in twenty-four hours; but experience has ſhewed this to be a miſtake.

TERRESTRIAL, ſomething partaking of the nature of earth, or belonging to the globe of the earth thus we ſay, the terreſtrial globe, line, *&c.* See the articles GLOBE, EARTH, LINE, *&c.*

TERRIER, a book, or roll, wherein the ſeveral lands, either of a private perſon, or of a town, college, church, *&c.* are deſcribed. It ſhould contain the number of acres, and the ſite, boundaries, tenants names, *&c.* of each piece or parcel.

TERRIER is alſo uſed for a ſmall hound, to hunt the fox or badger; ſo called, becauſe he creeps into the ground, as the ferrets do into the coney-burrows, after the fox, *&c.* See HUNTING.

TERRING, a market-town of Suſſex, ſituated on the Engliſh channel, twenty miles eaſt of Chicheſter.

TERRIS, BONIS, ET CATALLIS RETRAHENDIS, *&c.* a writ which lies for a clerk, to recover his lands, goods, and chattels, formerly ſeiſed, after clearing himſelf of a felony.

TERRIS ET CATALLIS RETENTIS ULTRA DEBITUM LEVATUM, a judicial writ brought for reſtoring of lands or goods to a debtor, that is diſtrained above the amount of the debt due.

TERRIS LIBERANDIS, a writ that lies for a perſon convicted on an attaint, to bring the proceſs before the king, and to

take

take a fine for his imprisonment, to deliver him his lands again, and release him of the strip and waste.

TERRITORY, in geography, denotes an extent or compass of land, within the bounds, or belonging to the jurisdiction, of any state, city or, other subdivision of a country.

TERROUEN, a town of Artois, in the french Netherlands, situated on the river Lis, six miles south of St. Omers.

TERTIAN, in medicine, an ague, or intermitting fever, the fits of which return every third day; that is, there are two fits in three days, the day intervening being without any fit at all.

A regular tertian is attended with the following symptoms: at first, the head aches, the limbs seem weary, there is a pain in the loins about the first vertebræ of the back, which tends towards the epigastrium, with a painful sensation of a tension in the hypochondria, and costiveness: then comes on a coldness of the external parts, especially of the nose and ears, a stretching, yawning, shivering, and shaking, sometimes so much as to make the bed tremble under them; the pulse is small, contracted, and weak; sometimes the patient is troubled with thirst; then follows a nausea, with a fruitless reaching to vomit: and to these symptoms there succeeds an anxious burning and dry heat, which pervades the whole body; the pulse becomes full and quick, the restlessness increases, the breathing is more difficult, and the patient, with his eyes almost closed, begins to talk a little wildly. However, the duration of the fit is uncertain, continuing sometimes ten or eleven hours, and sometimes twenty-four.

As to the method of cure, it differs but little from that recommended for quartans. See the articles QUARTAN and INTERMITTENT.

TERTIATE *a great gun*, in gunnery, is to examine the thickness of the metal at the muzzle, whereby to judge of the strength of the piece, and whether it be sufficiently fortified or not. This is usually done with a pair of calliber-compasses, and if the piece be bore-bored, the diameter less by the height, divided by 2, is the thickness at any place.

TERVEL, a city of Arragon, in Spain, situated on the river Gundalavira, seventy-five miles south of Sarragossa: west long. 1° 20′, north lat. 40° 35′.

TERVERE, a port-town of the united Netherlands, situated on the north-east coast of the island of Walcheren, four miles north-east of Middleburg.

TERUNCIUS, in roman antiquity, a very small brass-coin. See COIN.

TESCHIN, a city of Silesia, twenty-five miles south-east of Troppau: east long. 18°, and north lat. 49°. 50′.

TESSELATED PAVEMENTS, those of rich mosaic work, made of curious square marbles, bricks, or tiles, called tesselæ, from their resembling dice. See MOSAIC.

TESSIN, a river of Italy, which, taking its rise in the Alps, runs through the country of the Grisons and the lake Maggior; and then, turning south-east thro' the Milanese, passes by Pavia, and falls into the Po, a little below that city.

TEST, in metallurgy, a vessel of the nature of the coppel, used for large quantities of metals at once. See COPPEL.

Tests are usually a foot and a half broad, and are made of wood-ashes, not prepared with so much care as for coppel-making, and mixed with finely powdered brick-dust; these are made into the proper shape either by means of an earthen vessel of proper dimensions, or only an iron-ring. To make them in the first manner, an earthen vessel is to be procured, not glazed within, and by its depth and breadth proportioned to the quantity of metal to be worked: the inside of this vessel is to be well moistened with fair water, that the ashes to be put into it may adhere the better. Put into this vessel, thus prepared, the ashes and brick-dust before-mentioned, and first moistened either with water alone, or with water with a little white of an egg mixed in it: let the quantity of this be so much as will half fill the vessel, then press the mass with a wooden indented pestle; or, if not for a very large test, with a wooden cylinder only of an inch thick: when thus pressed down, add fresh ashes, and press them in a second time, as in the making of coppels, and repeat this addition of fresh ashes till the earthen vessel is nearly full; then remove the superfluous ashes with an iron-ruler, and let the inequalities remaining at the border, be smoothed with a wooden ball rolled round about. This done, you are to cut the cavity with a bowed iron, that you may have a broad spherical segment, not very deep: and lastly, by means of a sieve, strew this cavity carefully and regularly over with dry ashes of bones of animals, ground extremely fine, and squeeze these hard in, by the rotation

of the wooden ball. Thus you have a teſt finiſhed, which, together with its earthen pot, muſt be ſet in a dry warm place.

To make the teſts in the other manner, or by means of an iron-ring; let a ring of that metal be filled with aſhes, mixed with brick-duſt, and moiſtened as before-mentioned, in ſuch manner that they may riſe conſiderably above the ring; then preſs them ſtrongly, either with your hands, or with an indented peſtle, and afterwards, with gentle blows of a rammer, preſs the aſhes from the circumference towards the center, in a ſpiral line, and that in ſuch a manner, that, after having been ſufficiently preſſed, they may be a ſmall matter higher than the brink of the ring. If there are now any vacancies in the maſs, empty the ring, and fill it again with more aſhes; for if you ſhould attempt to fill up theſe by adding, were it but ever ſo little aſhes, the ſecond, or additional quantities, will never cohere ſo firmly with the firſt, but that they may probably ſeparate in the operation. This done, turn the ring upſide down, and on the other ſide, or bottom, take out the aſhes to the quantity of one third part of the depth of the ring; and again fill the vacuity with the ſame aſhes, in ſuch a manner that there may remain no ſenſible cavity. When the maſs is thus prepared, cut out a cavity in the larger ſurface of the ring, with a bowed iron, as in the former method.

TEST-LIQUOR, a liquor uſed by dealers in brandies, to prove whether they be genuine, or mixed with home-ſpirits. This liquor is nothing but a green or white vitriol, diſſolved in fair water; for a few drops of it being let fall into a glaſs of old french brandy, will turn the whole to a purple, or fine violet colour; and by the ſtrength or paleneſs of this colour, the dealers judge the brandy to be genuine or mixed, in different proportions, with home-ſpirits.

The people who uſe this liquor, place great confidence in it; but it is really a very vague and uncertain thing; for old french brandy, having long lain in the caſk, takes a dilute tincture of the wood of the caſk, that is, of oak; and this being of the ſame nature with a ſolution or tincture of galls, naturally turns bluiſh or blackiſh with vitriol. A new diſtilled brandy, though wholly foreign, would not give this teſt; and a common malt-ſpirit, with oak-chips infuſed in it, will turn as dark as the fineſt brandy. While our diſtillers, indeed, had nothing in uſe, for the colouring their ſpirits but burnt ſugar, it was poſſible to make ſome gueſs at an adulteration with them, becauſe the brandy, in this caſe, would not become blackiſh in proportion to its former colour, the ſugar colour not turning to ink with the vitriol, like the other: but our diſtillers have of late found a way of uſing an extract of oak, for the colouring of their ſpirits; and, ſince that, this teſt-liquor is of very little uſe, our common ſpirits, of any kind, turning as deep with it as the foreign brandies.

The very beſt way of making this teſt-liquor, is with a calcined vitriol of iron, diſſolved in a dilute or aqueous mineral acid. The liquor, when well made in this manner, is of a fine yellow colour, and will give, for a time, the fineſt blue to any ſpirituous tincture of oak.

TEST-ACT, a ſtatute 25 Car. II. cap. 2. which requires all officers, both civil and military, to take the oaths and teſt, *viz.* the ſacrament, according to the rites and ceremonies of the church of England; for the neglect whereof, a perſon executing any office, mentioned in that ſtatute, forfeits the ſum of 500l. recoverable by action of debt.

TESTACEOUS, in natural hiſtory, an epithet given to a ſpecies of fiſh, which are covered with a ſtrong thick ſhell, as tortoiſes, oyſters, pearl-fiſh, *&c.*

In ſtrictneſs, however, teſtaceous is only applied to fiſh whoſe ſtrong and thick ſhells are entire and of a piece: thoſe which are ſoft, thin, and conſiſt of ſeveral pieces jointed, as the lobſter, *&c.* being called cruſtaceous.

But, in medicine, all preparations of ſhells and ſubſtances of the like kind, are called teſtaceous powders: ſuch are powder of crab's claws and eyes, hartſhorn, pearl, *&c.* Dr. Quincy, and others ſuppoſe the virtue of all teſtaceous medicines to be alike; that they ſeldom or never enter into the lacteals, but that the chief of their action is in the firſt paſſages; in which caſe they are of great uſe in abſorbing acidities.

Hence they become of uſe in fevers, and eſpecially in rectifying the many diſtempers in children, which generally owe their origin to ſuch acidities.

TESTAMENT, *teſtamentum*, in law, a ſolemn and authentic act, whereby a perſon declares his will, as to the diſpoſal of his eſtate, effects, burial, *&c.* See the article WILL.

There

There are two ſorts of teſtaments, *viz.* one in writing, and one in words; which laſt is called a nuncupative teſtament, or will: but this is not good in caſe of lands, which are only deviſeable by a teſtament in writing, executed in the life-time of the teſtator.

TESTATOR, or TESTATRIX, the perſon who makes his or her will and teſtament.

TESTATUM, in law, a writ in perſonal actions, where, if the defendant cannot be arreſted on a capias, in the county where the action is laid, but is returned non eſt inventus by the ſheriff, this writ ſhall be ſent into any other county, where ſuch perſon is thought to be, or have wherewithal to ſatisfy the demand.

It is called teſtatum, becauſe the ſheriff has, before, teſtified that the defendant was not to be found in his bailiwick.

TESTE, in law, a word generally uſed in the concluſion of every writ, wherein the date is contained, and begins with *teſte meipſo, &c.* in caſe it be an original writ; or, if only judicial, then with *teſte*, naming the chief juſtice of the bench whence the writ iſſues.

TESTES, the TESTICLES, in anatomy, See the article TESTICLE.

The teſtes of the brain are two little, round, hard bodies, between the third and fourth ventricle, near the pineal gland. See the article BRAIN.

TESTICLE, *teſtis*, in anatomy, a double part in male animals, ſerving for generation. See GENERATION.

The teſticles are two in number, of an oval or egg-like figure, and are contained in a peculiar bag, called the ſcrotum. See the article SCROTUM.

But beſides this external covering, the teſticles themſelves have their coats or tunics; the firſt of which compoſes the cremaſter-muſcle, the office whereof is to raiſe the teſticle; the ſecond is the vaginalis tunica, formed of a proceſs of the peritonæum, and laxly ſurrounds the teſticle; the third is the tunica albuginea, which is robuſt and ſtrong, and adheres cloſely to the ſubſtance of the teſticle: this laſt receives the ſpermatic veſſels, and conveys them to the teſticle.

The ſubſtance of the teſticles is vaſculous, being compoſed of a great number of extremely minute veſſels, called vaſcula ſeminalia; which are convoluted together in the manner of the inteſtines, and appear beautifully after macerating the teſticles in vinegar. There is alſo a body, called, from the diſcoverer, corpus Highmori, wherein there is a cavity for the reception of the ſemen: this, in human ſubjects, is placed in the back of the teſticle; but in dogs, and many other animals, it is in the middle of the teſticle.

The veſſels of the teſticles are otherwiſe called ſpermatics. See SPERMATIC.

As to the uſe of the teſticles, it is to produce the ſemen maſculinum, for the purpoſe of generation. See SEMEN and GENERATION.

Some alſo give the name female teſticles, teſtes muliebres, to the ovaries of women. See the article OVARIES.

Tumours of the TESTICLES. When theſe happen from any external injury, the beſt application to diſperſe them, ſays Heiſter, are vinegar of litharge, lime-water, ſpirit of wine camphorated, and ceruſs, tutty, or lapis caliminaris mixed in it: but in the night-time, when the applications of fomentations are not ſo convenient, a plaſter of the mercurial kind, doubly ſated with mercury; or, in ſlight caſes, one of ſimple diachylon, may very properly be kept on. Internal medicines, ſuch as nitre, and the thin decoctions of diſcutient medicines, are alſo to be uſed; and, if occaſion call for it, bleeding in the arm is very proper.

This may be the method with tumours of theſe parts, from external injuries; but when they are from venereal cauſes, it is always neceſſary to give briſk purges, with the addition of a proper doſe of calomel to each; and warm and weak drinks ſhould be taken frequently, by which means theſe tumours are often diſperſed. See GONORRHOEA and POX.

But if either remedies are applied too late, or the inflammation is too violent, the tumour generally ends either in a ſuppuration or gangrene. In this caſe the maturating remedies are to be applied, ſuch as warm cataplaſms, and the like; and if the tumour does not break of itſelf at a proper time, from the application of theſe, it muſt be carefully opened with the knife, and the matter being diſcharged, the wound is to be cleanſed by injecting vulnerary decoctions, and afterwards healed with balſam of Peru, or the like.

TESTICULATED, among botaniſts, an appellation given to roots compoſed of two tuberoſe knobs, reſembling teſticles: ſuch are thoſe of orchis, *&c.*

TESTIMONIAL, a kind of certificate, ſigned either by the maſter and a fellow of

the college where the perſon laſt reſided; or by three, at leaſt, reverend divines, who knew him well for three years laſt paſt, giving an account of the virtues, uniformity, and learning of the perſon.

Teſtimonial is alſo a certificate, under the hand of a juſtice of peace, teſtifying the place and time when a ſoldier, or mariner landed, and the place of his dwelling, *&c.* whither he is to paſs.

There is alſo another kind of teſtimonial for the clergy, made by perſons preſent, that a clergyman has in all things complied with the act of uniformity; and to certify, that the clerk has performed what the law requires on his inſtitution and induction.

TESTIMONY, the ſame with evidence. See the articles EVIDENCE, WITNESS, and CERTITUDE.

TESTUDO, in zoology, a genus of amphibious animals, with four legs and a tail, and the body covered with a firm ſhell.

This genus comprehends all thoſe animals known in engliſh by the names of tortoiſes and turtles; of which there are a great many ſpecies, ſome with four toes on each foot; others with five toes on the fore feet, and four on the hinder ones; and others, diſtinguiſhed by other peculiarities, particularly the compartments of their ſhells, ſome being divided into irregular ſpaces, and others beautifully teſſelated. See plate CCLXXIV. fig. 2. n° 1. and 2.

The ſhells of theſe animals are much uſed in ornamental works, under the name of tortoiſe-ſhells; which, on importation, pay a duty of 1 s. $\frac{92\frac{5}{8}}{100}$ d. the pound; and, on exportation, draw back, 11 $\frac{64\frac{3}{8}}{100}$ d.

The turtle, whoſe fleſh is ſo finely flavoured, and ſo much eſteemed at table, is caught in great abundance in the american ſeas; and grows to a vaſt ſize, ſome having been found to weigh 480 pounds.

The Americans find ſo good account in catching turtle, that they have made themſelves very expert at it: they watch them from their neſts on ſhore, in moonlight nights; and, before they reach the ſea, turn them on their backs, and leave them till morning; when they are ſure to find them, ſince they are utterly unable to recover their former poſture: at other times they hunt them in boats, with a peculiar kind of ſpear, ſtriking them with it through the ſhell; and as there is a cord faſtened to the ſpear, they are taken much in the ſame manner as the whales. See the article FISHERY.

TESTUDO, in antiquity, was particularly uſed among the poets, *&c.* for the antient lyre; by reaſon it was originally made by its inventor, Mercury, of the black or hollow ſhell of the teſtudo aquatica, or ſea-tortoiſe, which he accidentally found on the banks of the river Nile. See the article LYRE.

TESTUDO, in the military art of the antients, was a kind of cover or ſcreen which the ſoldiers, *e. gr.* a whole company, made themſelves of their bucklers, by holding them up over their heads, and ſtanding cloſe to each other. This expedient ſerved to ſhelter them from darts, ſtones, *&c.* thrown upon them, eſpecially thoſe thrown from above, when they went to the aſſault.

TESTUDO was alſo a kind of large wooden tower which moved on ſeveral wheels, and was covered with bullocks-hides ſtead, ſerving to ſhelter the ſoldiers when they approached the walls to mine them, or to batter them with rams.

It was called teſtudo, from the ſtrength of its roof, which covered the workmen as the ſhell does the tortoiſe.

TESTUDO *veliformis quadrabilis*, a hemiſpherical vault, or cieling of a church, wherein four windows are ſo contrived, as that the reſt of the vault is quadrable, or may be ſquared. See VAULT.

The determining of thoſe windows was a problem propoſed to the great mathematicians in Europe, particularly the cultivators of the new calculus differentialis, in the Acta Eruditorum Lipſiæ, by Sig. Viviani, under the fictitious name of A. D. pio liſci puſillo geometra, which was the anagram of poſtermo Galilæi diſcipulo.

It was ſolved by ſeveral perſons, particularly Mr. Leibnitz, the very day he ſaw it: and he gave it in the Leipſic acts in an infinity of manners; as alſo did M. Bernoulli, the marquis de l'Hoſpital, Dr. Wallis, and Dr. Gregory.

TETANUS, in medicine, is a convulſive motion that makes any part rigid and inflexible. See CONVULSION.

TETBURY, a market-town, ſixteen miles ſouth of Glouceſter.

TETHYS, in ichthyology, a genus of fiſh of the order of the zoophytæ, the body of which is formed as it were of

Fig. 1. TENTS.

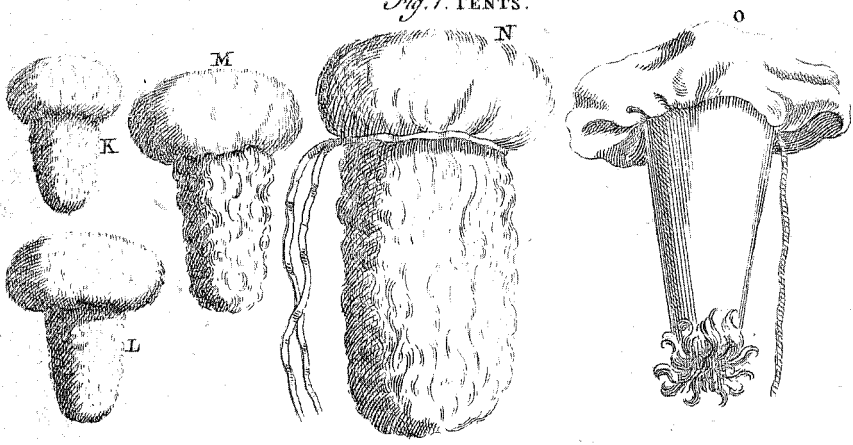


Fig. 2. TESTUDO.

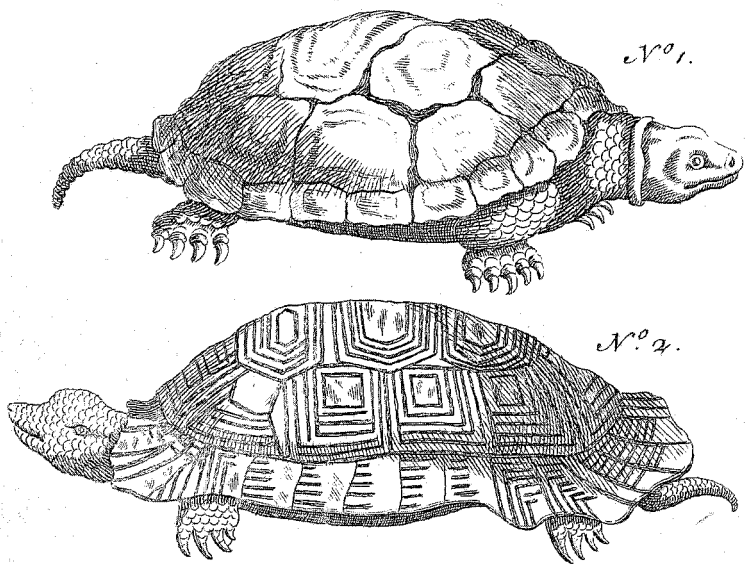
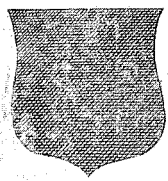
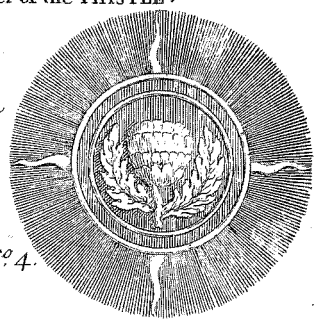


Fig. 4. The Order of the THISTLE.

Fig. 3. TENNÉ.





two lips of an oblong cartilaginous body; between them there are four tentacula, which have the form of ears, and two perforations in moſt ſpecies near the tentacula.

TETICACO, a great lake of Peru, more than two hundred miles in circumference: the towns ſituated on this lake are eſteemed the moſt delightful in all ſouth America.

TETRACERA, in botany, a genus of the *polyandria tetragynia* claſs of plants, without any flower petal: the fruit is compoſed of four oval capſules, formed each of a ſingle valve, opening by a ſuture in the upper part, and containing only one cell, with numerous, roundiſh, and covered ſeeds.

TETRACHORD, in the antient muſic, a concord conſiſting of four degrees or intervals, and four terms or ſounds; called alſo by the antients diateſſaron, and by us a fourth. See INTERVAL, DIAGRAM, DIATESSARON, and FOURTH.

This interval had the name tetrachord given it, with reſpect to the lyre and its chords or ſtrings.

TETRADIAPASON, a muſical chord, otherwiſe called a quadruple diapaſon, or eighth. See DIAPASON.

TETRADITÆ, a name given to ſeveral different ſects of heretics. The ſabbathians were called tetraditæ, from their keeping Eaſter-day on the fourth day, or on Wedneſday. The manichees, and others who admitted of a quaternity inſtead of a trinity in the Godhead, were alſo called tetraditæ. The followers of Petrus Fullenſis had the ſame appellation, by reaſon of the addition they made to the triſagion, to ſupport an error they held, that in our Saviour's paſſion it was not any particular perſon of the Godhead that ſuffered, but the whole deity.

TETRADYNAMIA, in botany, a claſs of plants, whoſe flowers have four of their ſtamina of more efficacy than the reſt: theſe are always known by having the four efficacious ſtamina longer than the reſt.

The tetradynamia of Linnæus include thoſe called by Tournefort cruciformes, and by Ray, ſiliquoſæ, and ſiliculoſæ.

The general characters of which are theſe: the perianthium is of an oblong figure, and is compoſed of four leaves, which are oval, oblong, hollow, obtuſe, and converging toward one another, and are gibbous at the baſe; theſe all fall off with the flower, and ſtand in pairs; the oppoſite ones being always equal in length, this cup is properly the nectarium of the plant, and it is on this occaſion that it is gibbous at the baſe. The flower is of that kind, called by Tournefort, cruciform; it conſiſts of four equal petals, which have ungues of the length of the cup, erect, and flat; the petals are broad at the top, and obtuſe, and ſcarce touch one another at the ſides; and the inſertion of the petals and of the ſtamina is in the ſame place.

The ſtamina are ſix ſubulated erect filaments, the two oppoſite ones are of the length of the cup, the other four are ſomething longer, and are of a leſs length however than the petals. The antheræ are oblong and pointed, thick at the baſe and erect, with apices bending ſideways. The nectariferous gland in the different genera of this claſs, is differently ſituated. It uſually, however, is found near the ſtamina, and moſt frequently of all is affixed to ſome ſhort filaments, and ſtands near their baſe. Two of the ſtamina are often curved, that they may not preſs upon this gland; and it is often owing to this, that two are ſhorter than the reſt. The germen of the piſtil is placed above the receptacle, and is every day in its growth raiſed higher and higher. The ſtyle is ſometimes wanting, but in ſuch plants as have it, it is of the length of the longer ſtamina. The ſtigma is always obtuſe.

The fruit or capſule is always a bivalve pod, which often contains two cells; this, when ripe, opens by ſplitting from the apex to the baſe, and it has always a little membranous ſubſtance ſerving within as a ſeptem, when the pod is bilocular; this ſtands out beyond the apex, and is the rudiments of what was before the ſtyle. The ſeeds are roundiſh, and the pod uſually narrow and oblong.

This is a very natural claſs of plants, and has been received as ſuch under whatever name by all the ſyſtematical writers in botany: and the plants contained under it are generally ſuppoſed to be all antiſcorbutics.

It is naturally ſubdivided into two ſeries; the one containing the ſiliculoſe plants, and the other the ſiliquoſe: the firſt have a ſhort pod, the others a long and ſlender one: the firſt pods uſually have more of the remains of the ſtyle than the others.

TETRAEDRON, or TETRAHEDRON, in geometry, one of the five regular or platonic

platonic bodies or ſolids, comprehended under four equilateral and equal triangles. See plate CCLXXV. fig. 3.

It is demonſtrated by mathematicians, that the ſquare of the ſide of a tetraedron is to the ſquare of the diameter of a ſphere, wherein it may be inſcribed, in a ſubſequialteral ratio: whence it follows, that the ſide of a tetraedron is to the diameter of a ſphere it is inſcribed in, as $\sqrt{2}$ to the $\sqrt{3}$, conſequently they are incommenſurable.

TETRAGON, in geometry, a general name for any fourſided figure, as a ſquare, parallelogram, rhombus, or trapezium. See PARALLELOGRAM, *&c.*

TETRAGON, in aſtrology, an aſpect of two planets with regard to the earth, more uſually called quartile. See the article QUARTILE.

TETRAGONIA, in botany, a genus of the *icoſandria-tetragynia* claſs of plants, without any corolla: the fruit is a coriaceous cruſt, formed into a ſort of ſquare figure by four longitudinal alæ, and contains a ſingle oſſeous ſeed with four cells.

TETRAGONOTHECA, in botany, a genus of the *ſyngeneſia-polygamia-ſuperfluua* claſs of plants, with a compound radiated flower, a paleaceous receptacle, and no down to the ſeeds.

TETRAGONIAS, a name given to a meteor, whoſe head is of a quadrangular figure, and its tail or train long, thick, and uniform.

TETRAGONISM, in geometry, a term uſed by ſome for the quadrature of a circle.

TETRAGONUS, in anatomy, a muſcle otherwiſe called quadratus genæ. See the article QUADRATUS.

TETRAGRAMMATON, a denomination given by the Greeks to the hebrew name of God, Jehovah, becauſe conſiſting of four letters.

TETRAMETER, in antient poetry, an iambic verſe, conſiſting of four meaſures, or eight feet. This kind of verſe is only found in the comic poets, as Terence, *&c.* See the article IAMBIC.

TETRANDRIA, in the Linnæan ſyſtem of botany, a claſs of plants, the fourth in order; comprehending all ſuch plants as have hermaphrodite flowers, with four ſtamina, or male-parts, in each. See the article BOTANY.

TETRAO, in ornithology, a genus of birds, of the order of the gallinæ, diſtinguiſhed by having the part of the forehead over the eyes naked and papilloſe.

This genus comprehends the urogallus major, or wood-cock; the urogallus minor, or growſe; the moor-cock, lagopus, *&c.* See UROGALLUS, *&c.*

TETRAPETALOUS, in botany, an epithet given to flowers that conſiſt of four ſingle petala or leaves, placed around the piſtil. See the article PISTIL.

TETRAPHARMACUM, ſignifies any remedy conſiſting of four ingredients.

TETRAPLA, in church hiſtory, a bible diſpoſed by Origen under four columns, in each whereof was a different greek verſion, *viz.* that of Aquila, that of Symmachus, that of the Seventy, and that of Theodotion. See the article BIBLE.

TETRAPTOTE, *tetraptoton*, in grammar, a name given to ſuch defective nouns as have only four caſes; ſuch are *vicis, pecudis, fordis*, &c. as being deprived of the nominative and vocative ſingular.

TETRARCH, *tetrarcha*, a prince who holds and governs a fourth part of a kingdom. Such originally was the import of the title tetrarch; but it was afterwards applied to any petty king or ſovereign, and became ſynonymous with ethnarch.

TETRASTICH, a ſtanza, epigram or poem, conſiſting of four verſes.

TETRASTYLE, in the antient architecture, a building, and particularly a temple, with four columns in its front.

TETRASYLLABICAL, a word conſiſting of four ſyllables.

TETRATONON, in muſic, a name whereby the ſuperfluous fifth is ſometimes called, as containing four tones.

TETUAN, a town of the empire of Morocco, ſituated about eight miles from the bay of that name, juſt within the ſtraits of Gibraltar: weſt long. 6° 35′, north lat. 35° 40′.

TEUCRIUM, in botany, a genus of the *didynamia-gymnoſpermia* claſs of plants, the corolla whereof is ringent, and formed of a ſingle petal: the tube is cylindric and ſhort, and terminates in an incurvated opening: the lower lip is divided into three ſegments; the lateral ones are of the figure of the upper lip, and ſomewhat erect; the middle one is much larger and rounded: there is no pericarpium; the ſeeds are four, roundiſh, and lodged in the baſe of the cup.

This genus comprehends the germander, polium, ſcordium, *&c.* This plant has the

the credit of being a great ſudorific and alexipharmic. It is preſcribed in malignant and peſtilential fevers, and in the plague itſelf, as alſo in obſtructions of the liver and ſpleen; it is ſaid to deſtroy worms externally; it cleanſes ulcers, and is applied by way of cataplaſm to mitigate pain; it is at preſent chiefly uſed in the ſhops as an ingredient in the confectio Fracaſtorii.

TEUTONIC, ſomething belonging to the Teutons, an antient people of Germany, inhabiting chiefly along the coaſts of the German ocean: thus, the teutonic language is the antient language of Germany, which is ranked among the mother tongues. The teutonic is now called the German or Dutch, and is diſtinguiſhed into upper and lower. The upper has two notable dialects, *viz.* 1. The Scandian, Daniſh, or perhaps Gothic; to which belong the languages ſpoken in Denmark, Norway, Sweden, and Iceland. 2. The Saxon, to which belong the ſeveral languages of the Engliſh, Scots, Friſian, and thoſe on the north of the Elbe. To the lower belong the Low Dutch, Flemiſh, *&c.* ſpoken through the Netherlands, *&c.*

TEUTONIC ORDER, a military order of knights, eſtabliſhed towards the cloſe of the twelfth century, and thus called as conſiſting chiefly of Germans or Teutons. The origin, *&c.* of the teutonic order is ſaid to be this. The Chriſtians, under Guy of Luſignan, laying ſiege to Acre, or Acon, a city of Syria, on the borders of the Holy Land, ſome Germans of Bremen and Lubec, touched with compaſſion for the ſick and wounded of the army, who wanted common neceſſaries, ſet on foot a kind of hoſpital under a tent, which they made of a ſhip's ſail, and here betook themſelves to a charitable attendance on them. This ſtarted a thought of eſtabliſhing a third military order, in imitation of the templars and hoſpitalers. The deſign was approved of by the patriarch of Jeruſalem, the archbiſhops and biſhops of the neighbouring places, the king of Jeruſalem, the maſters of the temple and hoſpital, and the german lords and prelates then in the Holy Land, and pope Calixtus III. confirmed it by his bull, and the new order was called the order of teutonic knights of the houſe of St. Mary at Jeruſalem. The pope granted them all the privileges of the templars and hoſpitalers of St. John, excepting that they were to be ſubject to the patriarchs and other prelates, and that they ſhould pay tythe of what they poſſeſſed. Others relate, that the teutonic order was eſtabliſhed at Jeruſalem, before the city of Acre was beſieged. The officers of the teutonic order, while in its ſplendor, were the grand maſter, who reſided at Marienburg; under him were the grand commander; the grand marſhal, who had his reſidence at Koningſberg; the grand hoſpitaler, who reſided at Elbing; the draper, who took care to furniſh the habits; the treaſurer, who lived at the court of the grand maſter, and ſeveral commanders, as thoſe of Thorne, Culme, Brandenburg, Koningſberg, Elbing, *&c.* They had alſo their commanders of particular caſtles and fortreſſes, advocates, proveditors, intendants of mills, proviſions, *&c.* This order is now little more than the ſhadow of what it formerly was, having only three or four commanderies, ſcarce ſufficient for the ordinary ſubſiſtence of the grand maſter and his knights.

TEWKSBURY, a borough-town of Gloceſterſhire, ſituated on the rivern Severn, ten miles north of Gloceſter.

It ſends two members to parliament.

TEXEL, an iſland of Holland, ſituated at the entrance of the Zuyder-ſea, parted from the continent of Holland by a narrow channel, through which moſt ſhips bound to Amſterdam paſs.

TEXT, a relative term, contradiſtinguiſhed to gloſs or commentary, and ſignifying an original diſcourſe excluſive of any note or interpretation. This word is particularly uſed for a certain paſſage of ſcripture, choſen by a preacher to be the ſubject of his ſermon.

A text-book, in ſeveral univerſities, is a claſſic author written very wide by the ſtudents, to give room for an interpretation dictated by the maſter or regent to be inſerted in the interlines. The Spaniards give the name of text to a kind of little poem or ſet of verſes placed at the head of a gloſs, and making the ſubject thereof, each verſe being explained one after another in the courſe of the gloſs. Text, in antient law-authors, is appropriated to the book of the four goſpels by way of eminence.

TEXTUARIES, *textuarii*, a name given the ſect of the caraites among the Jews. See the article CARAITES.

TEXTURE, *textura*, properly denotes the arrangement and coheſion of ſeveral ſlender bodies or threads interwoven or entangled

tangled among each other, as in the webs of ſpiders, or in cloths, ſtuffs, &c.

Texture is alſo uſed in ſpeaking of any union or conſtituent particles of a concrete body, whether by weaving, hooking, knitting, tying, chaining, indenting, intruding, compreſſing, attracting, or any other way. In which ſenſe we ſay, a cloſe compact texture, a lax porous texture, a regular or irregular texture, &c. A great deal depends on the texture of the component parts of a body; hence moſt of its particular properties, its ſpecific gravity, colour, &c.

TEYN, a town of Bohemia, ſituated fifty miles ſouth-weſt of Prague.

THALAMI *nervorum opticorum*, in anatomy, two oblong prominences of the lateral ventricles of the brain, medullary without, but a little cineritious within, being thus called becauſe the optic nerves riſe out of them.

THALIA, in botany, a genus of plants, the characters of which are not perfectly aſcertained: the calyx is an ovato-ſubulated univalve ſpatha. the corolla conſiſts of five ovato-oblong petals, hollowed and undulated at the edge; the two neareſt the ſpatha are ſmall and involute, the others are nearly equal, erect, and concave: the germen is oval: the fruit is an oval unilocular berry: the ſeed is ſingle, oſſeous, and bilocular; the nucleus is ſlender.

THALICTRUM, COMMON MEADOW RUE, in botany, a genus of the *polyandria-polygynia* claſs of plants, the corolla whereof conſiſts of four roundiſh, hollow, obtuſe, deciduous petals. The fruit conſiſts of a carinated, ſulcated bark, containing only one cell: the ſeed is ſingle and oblong.

This plant is an excellent aperient and ſtrengthener of the inteſtines, like rhubarb: but the doſe ought to be triple that of rhubarb. It is commonly ſaid to purge bile; the flowers are effectual in ſpitting of blood, the fluor albus, and other female diſorders; externally they are of ſervice in the ſcabies, all cutaneous diſeaſes, wounds and ulcers.

THAMES, a great navigable river of England, compoſed chiefly of the river Iſis and Thame, of which the Iſis is much the largeſt and runs the longeſt courſe, riſing on the confines of Gloceſterſhire. At Lechlade it becomes navigable, from whence it continues its courſe north-eaſt to Oxford, where it receives the Charwell: from Oxford it runs ſouth-eaſt to Abington, and ſo to Dorcheſter, where it receives the Thame, and continues its courſe ſouth-eaſt to Windſor, and thence runs eaſt to London, and continues the ſame courſe to the ſea; receiving the river Medway near the mouth of it. The Thame is but a ſmall river, which riſing near Tring in Hertfordſhire, croſſes the county of Bucks, and falls into the Iſis at Dorcheſter.

THANE, or THAIN, *thanus*, a name of an antient dignity among the Engliſh and Scots, or Anglo Saxons. Skene makes thane to be a dignity equal to the ſon of an earl. Camden will have it, that thanes were only dignified by the offices they bore. There were two kinds or orders of thanes, the king's thanes, and the ordinary thanes; the firſt were thoſe who attended the king in his courts, and who held lands immediately of the king. The ordinary thanes, or the thani minores, were the lords of the manors, who had particular juriſdiction within their limits, and over their own tenants; theſe changed their names for that of barons, and hence their courts are called courts-baron to this day.

THANE-LANDS, were lands granted by charters of our antient kings to their thanes, with all immunities, except the threefold neceſſity of expedition, repair of caſtles, and mending bridges.

THANET, a little iſland of eaſt Kent, formed by the branches of the Stour and the ſea.

THAPSIA, in botany, a genus of the *pentandria digynia* claſs of plants, the general corolla whereof is uniform: the ſingle flowers conſiſt each of five crooked lanceolated petals: the fruit is naked, oblong, ſurrounded longitudinally with a membrane, and ſeparable into two parts: the ſeeds are two, large, oblong, and convex, pointed at each end, and having on each ſide a plane margin, large and undivided, which is emarginated at top and bottom.

This plant is uſed to provoke the menſes, and other evacuations, and externally it is uſed in ointments for the itch, and the like cutaneous diſorders.

THAUMATURGUS, a worker of miracles, an appellation which the romaniſts give to ſeveral of their ſaints eminent for the number and greatneſs of their miracles.

THAWING, the reſolution of ice into its former fluid ſtate, by the warmth of the air, &c. See FREEZING.

Boerhaave obſerves, that if a ſudden thaw takes place after a long ſharp froſt, which has bound up the rivers, and penetrated the earth's ſurface to a conſiderable depth, it is, uſually, quickly ſucceeded by a multitude of clouds and uncommon heats, and then by thunder and lightening. The reaſon is, that the fat vapours and exhalations raiſed by the ſubterraneous heat, have long remained impriſoned under that covering of the earth, as appears hence, that if the ice of a ditch be broke in the middle of a ſevere froſt, it preſently emits warm vapours, and this the more plentifully, as well as the hotter, by how much the froſt is harder and the ice thicker. As ſoon, therefore, as the exterior frozen turf of earth is ſoftened by warmth, the pent-up vapours immediately eſcape through all the paſſages they can find, and mounting on high, form clouds, which being driven about, and ſometimes illumined by the ſun, produce ſuch effects. Hence theſe violent thunders in Muſcovy, Sweden, and Denmark, after a thaw.

THAXTED, a market-town of Eſſex, ſituated eighteen miles north of Chelmſford.

THEA, TEA, in botany. See TEA.

THEATINES, a religious order in the romiſh church, ſo called from their principal founder John Peter Caraffa, then biſhop of Theate, or Chieti, in the kingdom of Naples, and afterwards pope, under the name of Paul IV. The names of the other founders were Gaetan, Boniface, and Conſiglieri. Theſe four pious men deſiring to reform the eccleſiaſtical ſtate, laid the foundation of an order of regular clerks at Rome, in the year 1524. Pope Clement VII. approved the inſtitute, and permitted the brethren to make the three religious vows, to elect a ſuperior every three years, and to draw up ſtatutes for the regulation of the order. They firſt endeavoured, by their example, to revive among the clergy the poverty of the apoſtles and firſt diſciples of our Saviour, and were the firſt who aſſumed the title of regular clerks.

THEATRE, θεατρον, in antiquity, a public edifice for the exhibiting of ſcenic ſpectacles, or ſhews, to the people; comprehending not only the eminence on which the actors appeared, and the action paſſed, but alſo the whole area of the place, common to the actors and ſpectators.

The Romans borrowed the form of their theatres from thoſe of the Greeks, which were generally built in the ſhape of a ſemi-circle, encompaſſed with porticos, and furniſhed with ſeats of ſtone, diſpoſed in ſemi-circles, riſing gradually one above another.

The principal parts of the antient theatres were the ſcena, proſcenium, orcheſtra, and area. See the articles SCENA, PROSCENIUM, &c.

Among the moderns, theatre more peculiarly denotes the ſtage, or place whereon the drama or play is exhibited; anſwering to the proſcenium of the antients. It is alſo uſed, in a more comprehenſive ſenſe, for the whole play-houſe. See the articles DRAMA, PLAY, &c.

THEATRE is alſo uſed in architecture, chiefly among the Italians, for an aſſemblage of ſeveral buildings, which, by a happy diſpoſition and elevation, repreſents an agreeable ſcene to the eye.

Anatomical THEATRE, in a ſchool of medicine and chirurgery, is a hall, with ſeveral rows of ſeats, diſpoſed in the circumference of an amphitheatre; having a table bearing on a pivot, in the middle, for the diſſection of bodies.

THEBAID, *thebais*, a celebrated heroic poem of Statius, the ſubject whereof is the civil war of Thebes, between the two brothers Eteocles and Polynices; or, Thebes taken by Theſeus.

The thebaid is cenſured by the beſt of critics, for a multiplicity of fables and actions; for too much heat and extravagance, and for going beyond the bounds of probability.

THEBES, the name of an antient city in upper Egypt, now in ruins; as alſo an antient city of Achaia, now a province of european Turky.

THEFT, *furtum*, in law, an unlawful felonious taking away another man's moveable and perſonal goods, againſt the owner's will, with intent to ſteal them.

It is divided into theft or larceny, properly ſo called, and petit theft, or petit larceny; the former whereof is of goods above the value of 12d. and is deemed felony; the other, which is of goods under that value, is not felony. See the articles FELONY and LARCENY.

THEFTBOTE, the receiving a man's goods again from a thief, or other amends, by way of compoſition, and to prevent proſecution, that the felon may eſcape unpuniſhed; the puniſhment whereof is

impriſonment, but not the loſs of life or member.

THEISM, or DEISM. See DEISM.

THELIGONUM, in botany, a genus of the *monoecia-polyandria* claſs of plants, having no corolla: the calyx is bifid, and the piſtil ſingle: the fruit is a coriaceous capſule, containing only a ſingle cell, and in it one globoſe ſeed.

THELONIUM, in law-books, is uſed to denote any kind of toll. hence, citizens and other perſons who have a right to be free from toll, may have a writ called breve eſſendi quieti de thelonio.

THEME, in matters of education, denotes the ſubject of an exerciſe, for young ſtudents to write or compoſe on.

THEME, among aſtrologers, denotes the figure repreſenting the ſtate of the heavens for any time required; that is, the places of the ſtars and planets for that time. See the article HOROSCOPE.

THENAR, in anatomy, the abductor-muſcle of the thumb: it has its origin in the tranſverſe ligament that joins the bones of the carpus, and its termination in the firſt and ſecond phalanx the two ſeſamoide bones of the thumb are uſually found lodged in the tendon of this muſcle.

The abductor-muſcle of the great toe, likewiſe called thenar, has its origin from the internal ſide of the calcaneum, and the os naviculare; and its termination at the internal ſide of the great toe, beſide the internal ſeſamoide bone.

THEOBROMA, the CHOCOLATE-NUT-TREE, in botany, a genus of the *polyadelphia-pentandria* claſs of plants, the corolla of which conſiſts of five erecto-patent petals, each of them armed with a bifid ſeta: the nectarium is of a campanulated figure, and erecto-patent: the fruit is a woody cortex, of an unequal ſurface, with five ridges, and has ſeeds lodged in five ſeriesſes within it: theſe are numerous, fleſhy, nearly of an oval figure, and ſerve to make chocolate. See the article CHOCOLATE.

This genus comprehends the cacao of Tournefort, and the guazuma of Plumier; the former of which has a quadrangular pod, lengthened at each extremity; and the latter, a globoſe fruit, covered with tubercles, and its rind perforated in the manner of a ſieve.

THEOCRACY, θεοκρατεια, in matters of government, a ſtate governed by the immediate direction of God alone: ſuch was the antient government of the Jews, before the time of Saul.

THODOLITE, a mathematical inſtrument much uſed in ſurveying, for the taking of angles, diſtances, &c.

It is made variouſly, ſeveral perſons having their ſeveral ways of contriving it, each more ſimple and portable, more accurate and expeditious than others. The common one conſiſts of a braſs-circle about a foot diameter, cut in the form repreſented in plate CCLXXV. fig. 1. n° 1. having its limb divided into 360 degrees, and each degree ſubdivided, either diagonally, or otherwiſe, into minutes.

Underneath, at *c c*, are fixed two little pillars *b b* (*ibid.* n° 2.) which ſupport an axis, whereupon is fixed a teleſcope conſiſting of two glaſſes, in a ſquare braſs-tube, for the viewing of remote objects.

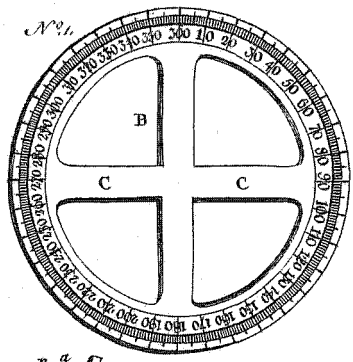
On the center of the circle moves the index C, which is a circular plate, having a compaſs in the middle, whoſe meridian line anſwers to the fiducial line *a a*: at *b b*, are fixed two pillars to ſupport an axis which bears a teleſcope like the former, whoſe line of collimation anſwers to the fiducial line *a a*. At each end of either teleſcope, is fixed a plain ſight for the viewing nearer objects.

The ends of the index *a a* are cut circularly, to fit the diviſions of the limb B; and when that limb is diagonally divided, the fiducial line, at one end of the index, ſhews the degrees and minutes upon the limb. The whole inſtrument is mounted with a ball and ſocket, upon a three-legged ſtaff.

Moſt theodolites have no teleſcopes, but only four plain ſights, two of them faſtened on the limb, and two on the ends of the index.

Mr. Siſſon's improved theodolite being one of the beſt of theſe inſtruments, we ſhall here give its deſcription, *ibid.* n° 3. The three ſtaves, whereby it is ſupported, ſcrew into bell-metal joints by braſs-ferrils at top, which are moveable between braſs-pillars fixed in a ſtrong braſs plate; in which, round the center, is fixed a ſocket with a ball moveable in it, and upon which the four ſcrews preſs that ſet the limb horizontal. Next above is ſuch another plate, through which the ſaid ſcrews paſs, and on which round the cencenter is fixed a fruſtum of a cone of bell-metal, whoſe axis, being connected with the center of the ball, is always penpendicular to the limb, by means of a conical braſs ferril fitted to it, whereon is fixed the compaſs-box, and on it the limb,

Fig. 1. THEODOLITE.



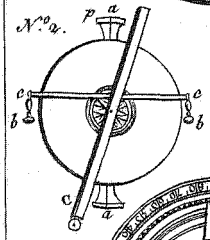
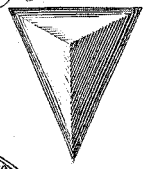
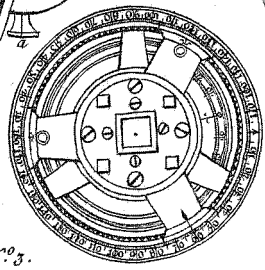


Fig. 3. TETRAEDRON





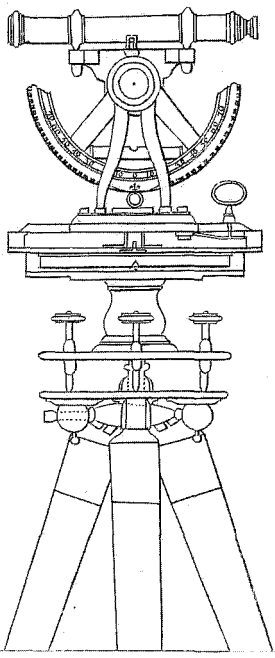
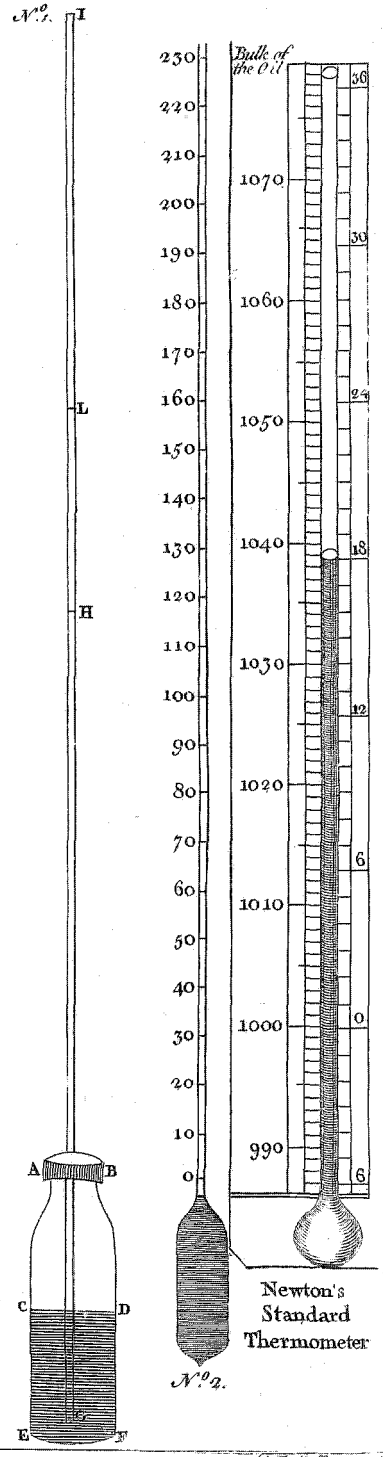


Fig. 2. THERMOMETER.



limb, which is a ſtrong bell-metal ring, whereon are moveable three braſs indexes, in whoſe plate are fixed four braſs pillars, that joining at top, hold the center-pin of the bell-metal double ſextant, whoſe double index is fixed in the center of the ſame plate. Within the double ſextant is fixed the ſpirit level, and over it the teleſcope. See LEVEL.

The compaſs box is graved with two diamonds for north and ſouth, and with 20 degrees on both ſides of each, that the needle may be ſet to the variation, and its error alſo known.

The limb has two fleur-de-luces againſt the diamonds in the box, and is curiouſly divided into whole degrees, and numbered to the left-hand at every 10° to twice 180°, having three indexes (with Nonius's diviſions on each for the decimals of a degree) that are moved by a pinion fixed below one of them without moving the limb, and in another is a ſcrew and ſpring under, to fix it to any part of the limb: it has alſo diviſions numbered for taking the quarter girt in round timber; to which a ſhorter index is uſed, having Nonius's diviſions for the decimals of an inch; but an abatement muſt be made for the bark, if not taken off. See RULE.

The double ſextant is divided on one ſide from under its center (when the ſpirit-tube and teleſcope are level) to above 60 degrees each way, and numbered at 10, 20, &c. And the double index (through which it is moveable) ſhews on the ſame ſide the degree and decimal of any altitude or depreſſion to that extent, by Nonius's diviſions; on the other ſide are diviſions numbered for taking the upright height of timber, &c. in feet, when diſtant ten feet, which at 20 muſt be doubled, and at 30 trebled; and alſo the quantities for reducing hypothenuſal lines to horizontal: it is moveable by a pinion fixed in the double index. See the article SURVEYING.

The teleſcope is a little ſhorter than the diameter of the limb, that a fall may not hurt it; yet it will magnify as much, and ſhew a diſtinct object as perfect, as moſt of treble its length: in its focus are very fine croſs wires, whoſe interſection is in the plane of the double ſextant, and this was a whole circle, and turned in a lathe to a true plane, and is fixed at right-angles to the limb; ſo that whenever the limb is ſet horizontal (which is readily done by making the ſpirit-tube level over two ſcrews, and the like over the other two) the double ſextant and teleſcope are moveable in a vertical plane, and then every angle taken on the limb (though the teleſcope be never ſo much elevated or depreſſed) will be an angle in the plane of the horizon, and this is abſolutely neceſſary in the plotting an horizontal plane. See PLOTTING and TELESCOPE.

The uſe of the theodolite is abundantly ſhewn in that of the graphometer, or ſemi-circle, which is only half a theodolite; and in that of the plain table, which is occaſionally made to be uſed as a theodolite. Note, the index and compaſs of a theodolite, likewiſe ſerve for a circumferentor, and are uſed as ſuch. See the articles GRAPHOMETER, PLAIN-TABLE, and CIRCUMFERENTOR.

THEOGONY, that branch of the heathen theology, which taught the genealogy of their gods. See the article GOD.

THEOLOGIUM, in the antient theatre, a kind of little ſtage, above that whereon the ordinary actors appeared; being the place where the machinery of the gods were diſpoſed; whence the name.

THEOLOGY, or DIVINITY, a ſcience which inſtructs us in the knowledge of God, or divine things; or which has God, and the things he has revealed, for its object. See the article GOD.

Hence theology may be diſtinguiſhed into natural, which comprehends the knowledge we have of God from his works, by the light of reaſon alone; and ſupernatural, which contains what we are taught concerning God in revelation.

Theology is again diſtinguiſhed into poſitive, moral, and ſcholaſtic. Poſitive theology is the knowledge of the holy ſcriptures, and of the ſignification thereof, conformably to the opinions of the fathers and councils, without the aſſiſtance of any argumentation. Some will have it, that this ought to be called expoſitive, rather than poſitive. Moral theology, is that which teaches us the divine laws relating to our manners and actions. Scholaſtic, or ſchool theology, is that which proceeds by reaſoning; or that derives the knowledge of ſeveral divine things from certain eſtabliſhed principles of faith.

THEOPHRASTA, in botany, a genus of the *pentandria-monogynia* claſs of plants, with a monopetalous campanulated petal, ſemi-quinquifid at the limb: the fruit is a large, globoſe, unilocular capſule, containing a great many roundiſh ſeeds.

THEORBA,

THEORBA, THIORBA, or TIORBA, a muſical inſtrument made in form of a large lute, except that it has two necks or juga, the ſecond and longer whereof ſuſtains the four laſt rows of chords which are to give the deepeſt ſounds.

THEOREM, a ſpeculative propoſition, demonſtrating the properties of any ſubject.

Theorems are either univerſal, which extend to any quantity, without reſtriction univerſally; as this, that the rectangle of the ſum, and difference of any two quantities, is equal to the difference of their ſquares: or particular, which extend only to a particular quantity; as this, in an equilateral right-lined triangle, each of the angles is 60 degrees.

Theorems are again diſtinguiſhed into negative, local, plane, and ſolid.

A negative theorem is that which expreſſes the impoſſibility of any aſſertion; as that the ſum of two biquadrate numbers cannot make a ſquare number. A local theorem is that which relates to a ſurface; as, that the triangles of the ſame baſe and altitude are equal. A plane theorem is that which either relates to a rectilinear ſurface, or to one terminated by the circumference of a circle; as that all angles in the ſame ſegment of a circle are equal. And a ſolid theorem is that which conſiders a ſpace terminated by a ſolid line; that is, by any of the three conic ſections. *e. gr.* this: that if a right line cut two aſymptotic parabola's, its two parts terminated by them ſhall be equal.

Reciprocal THEOREM, is one whoſe converſe is true; as that, if a triangle have two equal ſides, it muſt have two equal angles; the converſe of which is likewiſe true, that, if it have two equal angles, it muſt have two equal ſides.

THEORETIC, or THEORETICAL, ſomething relating to theory, or that terminates in ſpeculation. See THEORY.

Hence theoretical aſtronomy is that part of aſtronomy, which accounts for the various phænomena of the ſtars and planets. See STAR and PLANET.

THEORY, in general, denotes any doctrine which terminates in ſpeculation alone, without conſidering the practical uſes and application thereof. Thus the theory of chemiſtry, for inſtance, contains all the general truths which the particular experiments of chemiſts have hitherto demonſtrated. Theſe are, on this occaſion, to be taken for granted, and the whole body of ſuch truths makes the univerſal theory of chemiſtry, for chemiſtry is no ſcience formed *a priori*; it is no production of the human mind, or raiſed by reaſoning, but collected *a poſteriori* from experiments it took its riſe from various operations caſually made, and obſerving thoſe that had one and the ſame uniform tendency, without any expectation of what followed; and was only reduced into an art, by collecting and comparing the effects of ſuch uncertain experiments, and noting the tendency thereof: ſo far then as a number of experiments agree to eſtabliſh any unqueſtionable truth; ſo far they may be conſidered as conſtituting the theory of chemiſtry. See CHEMISTRY.

Such a theory is neceſſary to be premiſed to every art; and ſomething equivalent to this is practiſed by every artiſan, in teaching his diſciple how to proceed orderly in the exerciſe of his art; and accordingly it would be impoſſible to teach the practice of chemiſtry to advantage, without having firſt given ſome ſuch theory. Thus it would be to little purpoſe, to give a novice a parcel of roſemary, for inſtance, and bid him, without any addition, diſtil a water from it, which ſhould contain the natural taſte and odour of the plant; unleſs he knew before-hand this general truth, that plants, expoſed to a gentle heat, like that of the ſummer's ſun, do exhale their moſt ſubtle and volatile parts, which, being collected and condenſed by means of proper veſſels, appear in form of water, and are the thing required.

THERAPEUTÆ, a term applied to thoſe who are wholly employed in the ſervice of religion. This general term has been applied to particular ſects of men, concerning whom there have been great diſputes among the learned.

It is generally ſuppoſed, that St. Mark eſtabliſhed a particular ſociety of chriſtians about Alexandria, of whom Philo gives an account, and calls them Therapeutæ. He ſpeaks of them as a particular ſect, retired from the world, who ſpent their time in reading the writings of antient authors, in ſinging hymns and ſongs compoſed by ſome of their own ſect, and in dancing together the whole night. Scaliger maintains, they were Eſſene Jews; but Valeſius rejects this opinion of Scaliger, 1. becauſe Philo never calls them Eſſenes. 2. Becauſe there were

were no Eſſenes but in the holy land; whereas the Therapeutæ were ſpread through Greece, and all the barbarous nations. 3. Becauſe Joſephus, who gives a very ample account of the Eſſenes, does not ſay one word of the Therapeutæ.

THERAPEUTICE, THERAPEUTICS, that part of medicine which acquaints us with the rules that are to be obſerved, and the medicines to be employed in the cure of diſeaſes. See DISEASE.

THERAPHIM, or TERAPHIM, certain images, or ſuperſtitious figures mentioned in ſcripture. Some jewiſh writers tell us, the theraphim were effigies of human heads, placed in niches, and conſulted as oracles. Others ſay, they were taliſmans, or figures of metal, caſt and engraved under certain aſpects of the planets; to which they aſcribed extraordinary effects. All the eaſtern people are much addicted to this ſuperſtition; and the Perſians ſtill call them telefin, a name nearly approaching to theraphim.

The learned Spencer makes the word theraphim to be the ſame as ſeraphim, by change of the S into T: whence it follows, that theſe images were repreſentations of thoſe angels called ſeraphim. M. Jurien ſuppoſes them to have been a ſort of dii penates, or houſhold goods.

THERIACA ANDROMACHI, a compound medicine, made in the form of an electuary, the ingredients of which, according to the college of London phyſicians, are as follows: Take of the troches of ſquills, half a pound; long pepper, opium ſtrained, dried vipers, of each three ounces; cinnamon, balſam of Gilead, or in its ſtead, expreſſed oil of nutmeg, of each two ounces; agaric, the root of florentine orrice, water germander, red roſes, ſeeds of navew, extract of liquorice, of each an ounce and a half; ſpikenard, ſaffron, amomum, myrrh, coſtus, or in its ſtead zedoary, camel's hay, of each an ounce; the root of cinquefoil, rhubarb, ginger, indian leaf, or in its ſtead mace, leaves of dittany of Crete, of hore-hound, and of calamint, french lavender, black pepper, ſeeds of macedonian parſley, olibanum, chio turpentine, root of wild valerian, of each ſix drams; gentian root, celtic-nard, ſpignel, leaves of poley mountain, of St. John's wort, of ground pine, tops of creeping germander, with the ſeed, the fruit of the balſam-tree, or in its ſtead cubebs, aniſeed, the leſſer cardamom ſeeds huſked, ſeeds of biſhop's weed, of hartwort, of treacle muſtard, or mithridate muſtard, juice of the rape of ciſtus, acacia, or in its ſtead japan earth, gum arabic, ſtorax ſtrained, ſagapenum ſtrained, lemnian earth, or in its ſtead bole armenic or french bole, green vitriol calcined, of each half an ounce; root of creeping birthwort, or in its ſtead of the long birthwort, tops of the leſſer centaury, ſeeds of the carrot of Crete, opopanax, galbanum ſtrained, ruſſia caſtor, jew's pitch, or in its ſtead, white amber prepared, root of the ſweet flag, of each two drams; of clarified honey, thrice the weight of all the reſt. The ingredients are to be mixed in the ſame manner as in the mithridate.

The college of Edinburgh have given the following reformation of this compoſition, under the title of Theriaca Edinenſis.

Take of virginian ſnake root, ſix ounces; wild valerian root, contrayerva root, each four ounces; aromatic powder, three ounces; reſin of guaiacum, ruſſia caſtor, myrrh, each two ounces; engliſh ſaffron, opium, each one ounce; clarified honey, thrice the weight of the powders; canary wine, as much as is ſufficient to diſſolve the opium. This compoſition conſiſts of very powerful ingredients, and is doubtleſs capable of anſwering every thing that can be reaſonably expected from the more voluminous theriaca of Andromachus.

THERMÆ, artifical hot baths, much uſed by the Romans. See BATH.

THERMOMETER, an inſtrument for meaſuring the increaſe and decreaſe of the heat and cold of the air, by means of the elaſtic and expanſive power of bodies of the fluid ſort. See the articles AIR, HEAT, COLD, &c.

Many different ways, methods, and forms of conſtructing ſuch an uſeful inſtrument have been thought of, and invented at ſeveral times for this purpoſe; at firſt air, then oil, then ſpirits of wine, and laſtly, quickſilver, have been every way attempted and tortured in this experiment.

The ſpring of air, being ſooner affected by heat and cold than that of any other fluid, was firſt thought upon as the beſt expedient to anſwer this end; and ſo it really would be, were it not that the weight or preſſure of the atmoſphere affects it alſo at the ſame time; and by acting ſometimes with, ſometimes againſt it,

it, renders the effect by heat or cold very uncertain, and, therefore, the inſtrument uſeleſs. For example: the air in the bottle AF (plate CCLXXV. fig. 2. n° 1.) will, by its expanſion, when the air grows warmer, raiſe the water higher in the tube than the point H; and if the air be lighter at this time, it will preſs leſs on the ſurface of the water at H, and ſo will ſuffer it to riſe ſtill higher. But if the air be heavier, it will act againſt the ſpring, and not permit it to raiſe the water ſo high. The ſame may be obſerved with reſpect to its contraction by cold; wherefore ſuch an inſtrument, for common or conſtant uſe, will not do at all, though, perhaps, none is better calculated for ſome extemporaneous uſes, as meaſuring the degree of coldneſs in different cellars, or of warmth in divers rooms upon the ſame floor.

It was upon this account found neceſſary to have recourſe to ſome other fluid, which, ſecured from the preſſure of the air in a tube, hermetically ſealed, might expand and contract ſolely by the heat and coldneſs of the air about it. And, becauſe moſt fluids are ſubject to freeze or thicken in great degrees of cold, it was ſoon conſidered that ſpirits of wine, a little tinged with cochineal, would beſt anſwer the purpoſe, and accordingly thermometers were generally made therewith, and became of common uſe.

Though the ſpirit of wine thermometers would do very well to ſhew the comparative heat of the air, yet this was far ſhort of the virtuoſo's views, who wanted to explore the various and vaſtly different degrees of heat in other bodies, as boiling water, boiling oils, melted metals, and even fire itſelf, and degrees of cold too, beyond what the ſpirit thermometer can ſhew. For ſpirit in a moderate degree of heat will burſt the tube; and in an intenſe degree of cold will freeze, as the french philoſophers found, who went to meaſure a degree upon the ſurface of the earth under the north polar circle.

It having been found by experiment, that linſeed oil required four times the degree of heat to make it boil as water did, it was quickly ſubſtituted inſtead of ſpirits for philoſophic uſes. This Sir Iſaac Newton always uſed, and by it diſcovered the comparative degree of heat which makes water boil, which melts wax, which makes ſpirit of wine boil, and melts tin and lead; beyond which we do not find the oil thermometer has been applied: for which reaſon (as alſo for its ſullying the tube) it has been leſs uſed of late.

The mercurial thermometer, which will ſuſtain any degree of heat or cold, as far as any inſtrument of this kind can be expected to do, was invented by Mr. Farenheit, of Amſterdam; and though ſeveral artificers made them as well as he, yet they ſtill go by his name. Dr. Boerhaave uſed only this thermometer. As the mercury very freely and uniformly expands itſelf from hard froſt to the heat of ſummer, ſo one ſort of thoſe thermometers are contrived with a ſcale, to include thoſe extremes only, and the beginning of the diviſions, or o, is fixed to that altitude of the quickſilver, as is obſerved when water juſt begins to freeze, or ſnow to thaw; for which reaſon that is called the freezing point in the ſcale. This thermometer is ſmall, ſhort, put in a neat frame, and carried in the pocket any where.

But the grand thermometer of Farenheit is graduated after a different manner, as deſtined to a more critical and extenſive uſe. In this the bulb, or large part at the bottom, is not ſpherical, as in common ones; but cylindrical; to the end, that the heat may penetrate and reach the inmoſt parts as ſoon as poſſible, ſo that the whole may expand uniformly together. Hence it is, that in the cylindric bulb the fluid will expand and riſe immediately, whereas in the ſpherical bulb it is ſeen firſt to fall (by the ſudden expanſion of the ball, before the fluid is heated) and then to riſe, by the expanſion of the fluid when heated. We have given a figure, both of Farenheit's mercurial thermometer, and alſo of Sir Iſaac Newton's made with linſeed oil. See plate CCLXXV. fig. 2. n° 2.

Sir Iſaac's ſeems to be the beſt fitted of any for a ſtandard weather thermometer; and even for any degree of heat which the various ſtates of the human body exhibit; and alſo for thoſe different degrees which vegetation requires in the green-houſe, hot-bed, &c. In all which caſes it is neceſſary there ſhould be one common, unerring, and univerſal meaſure, or ſtandard, which at all times, and at every place, will ſhew the ſame degree of heat, by the ſame expanſion of the fluid, according to which the ſcale ſhould be made in every ſtandard thermometer. In order to this, the tube propoſed ſhould be very nicely weighed, when empty,

and then the bulb, and about a tenth part of the length of the tube above it, is to be filled with quickſilver; then it is to be weighed again, and the exceſs of this, above the former weight, will give the weight of the quickſilver poured in; this will give the weight of the 100th part. Let a mark be made with a file upon the tube at the ſurface of the incloſed quickſilver.

Then weigh out nine or ten parcels of quickſilver, each equal to a hundredth part of that firſt put in the tube, and having poured the ſeveral parcels in one after another upon the incloſed quickſilver, and marked the tube ſucceſſively at the ſurface of each parcel, you will have the tube divided into proper intervals, which, if the bore of the tube be everywhere the ſame, will be equal to each other; if not, they will be unequal; and each of theſe intervals is to be divided into ten others, increaſing or decreaſing as the intervals do.

When this is done, the capacity of the tube is divided into thouſandth parts of that of the ball, and the contiguous part of the tube reaching up to the firſt mark. The tube is now to be put into a frame, and by the ſide of it is to be placed a ſcale, divided into thouſandth parts, exactly correſponding to thoſe on the tube; and writing 1000 over-againſt the firſt mark, you write 1010 over-againſt the ſecond, 1020 againſt the third, and ſo on, as you ſee in the figure.

The ſtandard thermometer-tube, and its ſcale, being thus conſtructed, is then to be filled with ſome proper fluid, as linſeed-oil, where great degrees of heat are not propoſed; and mercury is to be uſed, when they are. When the fluid is poured in, it is to be adjuſted in ſuch a quantity, that it may ſtand juſt at the principal point, marked 1000, in water juſt freezing. And here great precaution is to be uſed; for many trials muſt determine this point to which the fluid muſt always riſe by ſlow degrees, and with an uniform motion.

When this point is well ſecured, all the trouble is over, the ball, being then immerſed in boiling water, ſpirits, oils, melted metals, &c. in ſnow, freezing mixtures, &c. the expanſions, by all the various degrees of heat and cold, will be ſhewn by the numbers againſt the heights to which the fluid riſes in the tube, in each caſe, theſe are to be wrote on the ſide of the ſcale; and, ſince the ſame degree of heat will cauſe the ſame expanſion of the ſame fluid at all times, it is evident, if thermometers were everywhere conſtructed in this manner, the obſervations made by them in any part of the world, may be compared together, which cannot otherwiſe be done; whence this part of philoſophy would receive its final perfection.

By one of thoſe ſtandard thermometers well made, many more might ſoon be conſtructed with any expanding fluid, without the trouble of graduating their tubes by equal quantities of quickſilver. For having filled the balls, and a convenient part of the tube, with the propoſed fluid, place them all together in a veſſel of cold water; and while it is warming as gently as poſſible, when the oil in the ſtandard thermometer ſhall arrive ſucceſſively at the ſeveral diviſions of its ſcale, at the ſame inſtant of time mark the new tubes at the ſeveral heights of their fluids, and form a ſcale for every tube, that ſhall correſpond to thoſe marks. Then, while the liquors ſubſide by cooling gently, examine whether they nicely agree at the ſeveral marks. To determine the freezing point in all, they are to ſtand together in the water till it juſt begins to freeze: or, having all the other points duly, that may be deduced very exactly by the rule of proportion.

A thermometer that ſhall vary very ſenſibly by every ſmall variation of heat and cold, as thoſe of the atmoſphere, muſt have a large ball in proportion to the bore of the tube; and, that the heat or cold may ſooner penetrate the innermoſt parts of the liquor, the ball ſhould not be ſpherical, but oblong and flatted like a french flaſk; and the lengths of the tubes ſhould be proportioned to the degrees of heat they are intended to diſcover.

Sir Iſaac Newton gradated his ſtandard thermometer on both ſides, as ſhewn in the figure. Thoſe on the right hand meaſured the heat of the oil; as thoſe on the left meaſured the bulk thereof: but ſince the latter, as well as the former, begins from a cypher at the freezing point, and is regularly continued upwards by the common diviſions 10, 20, 30, 40, &c. it will equally ſerve both purpoſes; ſince the degree of heat will

always be proportioned to the expanſion of the bulk of the fluid above or below the freezing point.

By this diviſion therefore on the left hand, we ſhall expreſs ſome of the principal articles of Sir Iſaac Newton's ſcale of the various degrees of heat, as in the table below.

D. of heat.	
0	Water juſt freezing, and ſnow juſt thawing.
1 to 4	The heats of the air in winter.
4 to 8	The heats of the air in ſpring and autumn.
8 to 12	The heats of the air in ſummer.
13	The greateſt ſummer-heat.
26	The greateſt heat of the external parts of the human body.
31	Water juſt tolerable to the hand at reſt.
36½	Water hardly tolerable to the hand in motion.
43	Melted wax juſt growing ſtiff and opake.
51½	Melted wax juſt before it bubbles or boils.
54	Spirit of wine juſt begins to boil.
72	Water begins to boil.
75	Water boils vehemently.
86	A mixture of $\frac{1}{10}$ of lead, $\frac{2}{5}$ of tin, and $\frac{1}{2}$ biſmuth, melts.
103	A mixture of equal parts of tin and biſmuth melts.
122	A mixture of $\frac{3}{5}$ of tin and $\frac{2}{5}$ of lead melts.
154	The heat which melts tin.
374	The heat which melts biſmuth.
206	The leaſt heat which melts lead.
290	The heat with which burning bodies ſhine in a dark place.
410	The heat of a ſmall coal-fire.
450	The heat of a ſmall wood-fire.

Dr. Hales conſiders the freezing point as one boundary to vegetation, *viz.* on the ſide of cold; and the other boundary he fixes to that degree of heat with which wax will begin to melt, becauſe a greater degree of heat will, inſtead of collecting and aſſimilating the nutritive particles, diſſipate them, even thoſe which are moſt viſcid and glutinous; and therefore the plant will rather fade than vegetate in ſuch degrees of heat.

This ſpace the doctor divided into one hundred equal parts in his thermometers: but his numbers, expreſſed in thoſe of the ſtandard-thermometer, are for ſeveral particulars mentioned by the doctor as follows. For myrtle, 4½; oranges, 6½; ficoides, 7½; indian fig, 8¼; aloe, 10; cereus, 11; euphorbium, 12; piamento, 13; ananas, 14½; melon-thiſtle, 15¼; air under the glaſs of a hot-bed, 17; the hot-bed itſelf, 28. If the hot-bed exceed the heat of 40, or thereabouts, it will ſcorch the plants and kill them. The heat of milk from the cow is 28, that of urine 29, and of blood in a fever nearly 40.

As Farenheit's thermometer is come into ſuch general uſe, we have here placed it by the ſtandard thermometer, that the diviſions on each may be reduced to the other's reſpectively by bare inſpection, and the uſe of both be ſtill preſerved.

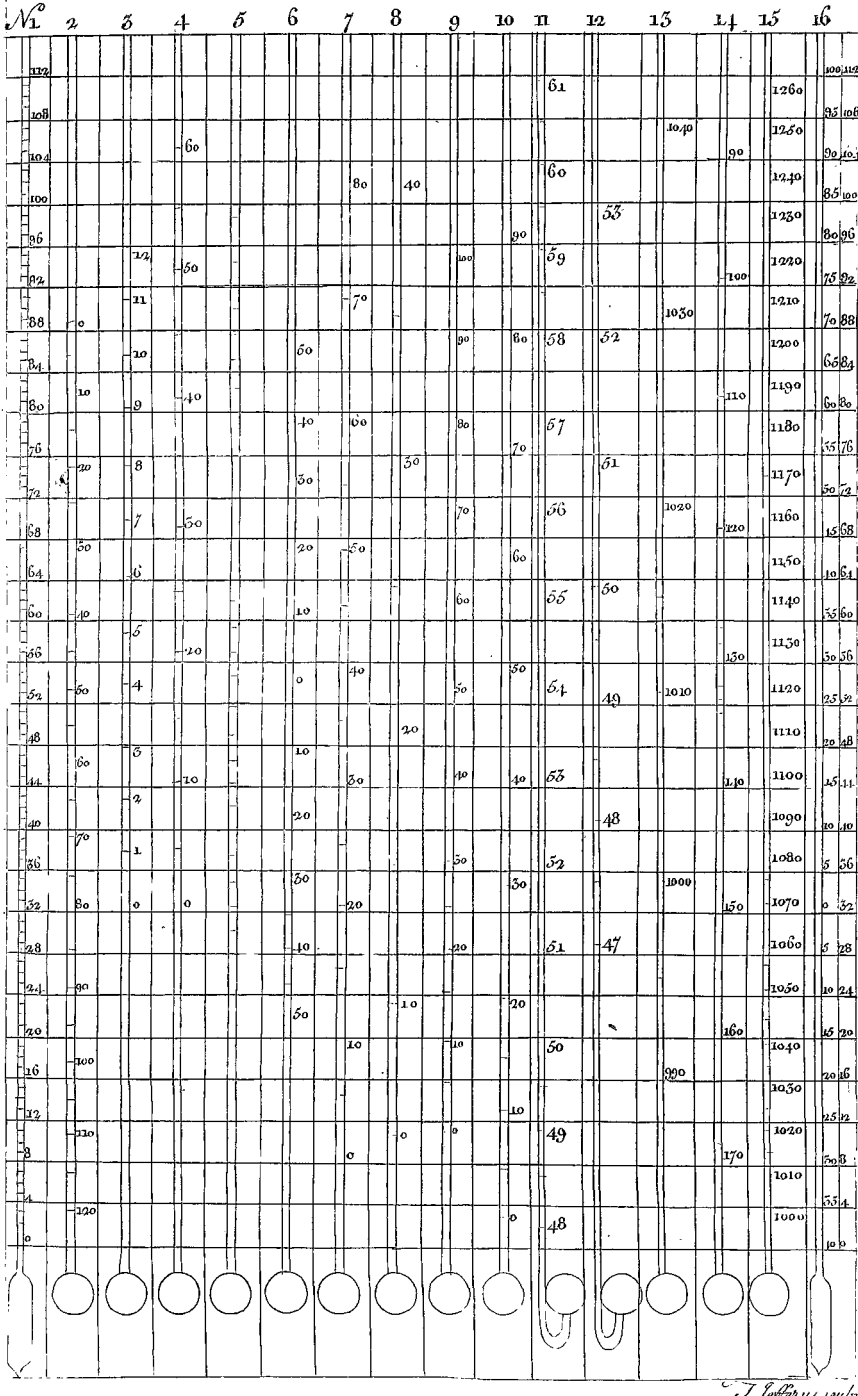
But that the reader may be enabled to form ſome idea of the ſeveral ſorts of thermometers, and the different methods of graduating them, we have given a comparative view of the moſt remarkable ones in plate CCLXXVI. where n° 1. repreſents Farenheit's thermometer; n°2. that of the Royal-ſociety; n° 3. Sir Iſaac Newton's; n° 4. Dr. Hales's; n° 5. that of Edinburgh; n° 6. Fowler's; n° 7. and 8. thoſe of Florence; n° 9. that of Paris; n° 10. De la Hire's; n° 11. Amonton's; n° 12. Poleni's; n° 13. Reaumur's; n° 14. De l' Iſle's; n° 15. Crucquis's, and n° 16. Th. de Lyon's. The reader may alſo conſult Dr. George Martine's treatiſe on this ſubject, where he will find it explained to his ſatisfaction.

THERMOSCOPE, an inſtrument ſhewing the changes happening in the air with reſpect to heat and cold.

The word thermoſcope is generally uſed indifferently with that of thermometer, tho' there is ſome difference in the literal import of the two; the firſt ſignifying an inſtrument that ſhews, or exhibits, the changes of heat, *&c.* to the eye; and the latter an inſtrument that meaſures thoſe changes; on which foundation the thermometer ſhould be a more accurate thermoſcope, *&c.* This difference the excellent Wolfius taking hold of, deſcribes all the thermometers in uſe as thermoſcopes; ſhewing that none of them properly meaſures the heat, *&c.* none of them do more than indicate the ſame. Though their different heights, yeſterday

and

A Comparitive View of the most remarkable THERMOMETERS



and to-day, ſhew a difference of heat, yet, ſince they do not diſcover the ratio of yeſterday's heat to to-day's, they are not ſtrictly thermometers.

THESEA, in antiquity, feaſts celebrated, by the Athenians, in honour of Theſeus, conſiſting of ſports and games, with mirth and banquets: ſuch as were poor and unable to contribute to them were entertained at the public expence.

THESIS, a general poſition which a perſon advances, and offers to maintain. In colleges it is frequent to have placards, containing a number of them, in theology, in medicine, in philoſophy, in law, *&c.*

THESIUM, in botany, a genus of the *pentandria-monogynia* claſs of plants, having no corolla but the calyx, which being coloured on the inſide has paſt for a corolla with ſome: there is no pericarpium: the calyx holds in its bottom a ſingle roundiſh ſeed.

THESSALY, now called Janna, a province of european Turkey, bounded by Macedonia, on the north; by the Archipelago, on the eaſt; by Achaia, or Livadia, on the ſouth; and by Epirus, on the weſt.

THETFORD, the county town of Norfolk, ſituated twenty-five miles ſouth-weſt of Norwich.

It ſends two members to parliament.

THEVETIA, in botany, a genus of the *pentandria-monogynia* claſs of plants, the corolla whereof conſiſts of an infundibuliform petal: the tube is oblong: the limb large, and divided into five ſegments: the fruit is an orbiculated, unilocular, depreſſed drupe, acuminated on the central part: the ſeed is an ovato-trigonal nut.

THEURGY, a name given to that part of magic called white magic, or the white art. Thoſe who have written of magic have divided it into three kinds; the firſt is theurgy, as operating by divine means: the ſecond, natural magic; performed by the powers of nature: and the third, necromancy; which they imagined proceeded from invoking dæmons. See MAGIC.

THIBET, or TIBET, one of the moſt powerful of the Tartar kingdoms, having China on the eaſt and India on the weſt.

THIGH, *femur*, in anatomy, that part of the body of men, quadrupeds, and birds, between the leg and the trunk. See the article FEMUR.

Fractures and Luxations of the THIGH. The thigh-bone, though the largeſt and ſtouteſt in the whole body, is yet frequently broken, both near its middle and towards its ends or articulation, but more particularly near that part called its neck, near its articulation with the hip-bone; and when this is the caſe it is very difficult to ſet it, and retain it in its place. When the bone is broken in two places at once, which ſometimes happens, the danger is much greater. Sometimes this bone is broken tranſverſely, ſometimes obliquely, and at other times the ends ſlip in a great way over one another, notwithſtanding the utmoſt caution in ſetting it. It is therefore neceſſary in theſe caſes, according to Heiſter, beſides the means that are common to all the fractures, to uſe a more ſtrict and tight bandage in this than in the tranſverſe fracture, to prevent the bones from being eaſily removed. When a fracture of the thigh-bone happens near the middle, or towards its lower head, it is to be extended and replaced with the hands like other fractures, except that the extending force required is very great: and where the hands of a ſtrong aſſiſtant are not enough, ſlings, napkins, or linnen bandages are to be bound round each head of the thigh, whereby the fractured bone may be extended both ways by the ſtrength of three or four perſons at once, while the ſurgeon cautiouſly reduces the fracture with his hands, and ſecures it with a proper bandage and dreſſing: and there are ſometimes caſes where the joint ſtrength of three or four men applied in this manner, is not ſufficient to make the neceſſary extenſion; in which caſe the ſurgeon is obliged to have recourſe to ropes and pullies, by means of which one man will pull more forcibly and equally than ſeveral can without them: but caſes that require this treatment are not common. See the articles FRACTURE and EXTENSION *of fractured limbs*.

When the neck of the thigh-bone is fractured, to which, from its oblique or tranſverſe direction, and ſpongy or brittle ſubſtance, it is very ſubject, it makes a fracture not only difficult to reduce, but ſuch a one as can ſeldom be cured without leaving the limb ſhorter than it was before. The reaſons of which are, that the fragments cannot, but with great difficulty, be preſſed into their right

places, by reaſon of the great thickneſs and ſtrength of the muſcles which cover them; and, that it ſeldom happens that the bones can be retained in their natural poſition after they have been ever ſo well reduced; becauſe the muſcles which paſs over, and are inſerted below, the neck of this bone, draw its lower part upwards: to which may be added, that it is very difficult to diſcover when the neck of the thigh-bone is fractured; this caſe being uſually taken for the head of the bone being ſlipped out of its ſocket. If the fracture of the bone be accompanied with a wound, it makes the caſe very difficult and dangerous; and if theſe accidents happen to be inflicted on the neighbouring joint, death is generally the conſequence, more eſpecially when any of the large veſſels are wounded. See WOUND and HÆMORRHAGE.

The thigh-bone, Heiſter obſerves, is found to be capable of luxation four ways, upwards and downwards, and backwards and forwards; but it is moſt frequently diſlocated downward and inward, towards the large foramen in the os pubis. For beſides that the cartilaginous defence on the lower part of the acetabulum is not ſo high as on the reſt, the ligamentum rotundum is ever found to give way more readily in that part than in any other; and, laſtly, the adjacent muſcles are found to be weakeſt on this part. And there is beſides, a certain eminence in this edge of the acetabulum which prevents the head of the bone from falling back again eaſily into its right place when once it is got this way out of it. But if the head of this bone be diſplaced outwards, it generally ſlips upwards at the ſame time, it being ſcarce poſſible but that the very ſtrong muſcles of the thigh muſt then draw the bone upwards; and there is no eminence in this edge of the acetabulum to reſiſt the head of the bone in that paſſage. See LUXATION.

When the thigh is diſlocated forwards and downwards, which is what moſt uſually is the caſe, the leg hangs ſtradling outward, and is longer than the other; the knee and foot alſo both turn outwards, and the head of the bone itſelf will be felt near the lower part of the inguen and os pubis. Sometimes there is a ſuppreſſion of urine in this caſe, which is occaſioned by ſome nerve which communicates with the bladder being violently compreſſed; in the buttock there alſo may be perceived a cavity from the trochanter major, and the reſt of the bones being diſplaced; and if the thigh-bone be not timely reduced into its acetabulum, the whole limb withers ſoon afterwards. The patient, for this reaſon, can bear little or no ſtreſs upon that limb, but muſt always incline and throw the weight of his body upon the other: when he moves forward, he muſt move that limb in form of a ſemicircle, and ſupport his body by crutches under the arms: though there are not wanting particular caſes where the head of the luxated thigh-bone has grown ſo firmly to the adjacent part, without the acetabulum, as to become, in proceſs of time, ſo ſtrong as to ſupport the body without ſticks, though the perſon could not, in any of the caſes that have been known of this kind, walk without halting.

If the thigh-bone be diſplaced backward, it is uſually drawn upward alſo, as before obſerved, at the ſame time; hence there will be perceived, in this caſe, a cavity behind the inguen, and a tumour upon the buttock, becauſe the head, and trochanter of this bone, will be placed there. The tumour on the buttock being thruſt upward, the limb will become ſhorter than before, and the foot will be inclined to turn inwards. The heel will not touch the ground, but the perſon ſeem to ſtand upon his toes; and laſtly, the luxated limb will be much more eaſily bent than extended.

It is extremely rare that the thigh is luxated forward or backward, without being alſo drawn upward or downward; but if it ſhould ſo happen, it will yet evidently be diſcovered by the rules before given, and by conſidering the nature of the articulation of the bone: as it is, however, at beſt very difficult to diſcover when the thigh-bone is diſlocated, and when it is fractured, either by feeling or inſpecting, becauſe of the great thickneſs of the muſcles and integuments: it is therefore a matter of ſome conſequence to propoſe the ſigns by which one of theſe caſes may be known from the other. There is reaſon to judge the thigh-bone to be luxated when we find the ligaments of the bone have been relaxed by ſome preceding congeſtion of humours, when no external violence has been exerted upon it, when neither violent pain, tumours, nor inflammation

follow;

follow; and laſtly, when the whole limb may be bent, and turned about at the acetabulum, without the ſurgeon's diſcovering any grating or cruſhing of the bones; and the contrary of theſe ſigns, which are what uſually take place, in what have been uſed to be called luxations of this bone, are very ſtrong indications of a fracture.

When the bone is found to be really diſlocated, it is to be reduced in a method agreeable to the nature and direction of the diſlocation. When it is diſplaced forward and downward, the patient is to be laid flat upon his back on a table; then a linen napkin, or ſtrong ſling, is to be made faſt about the groin, over the part affected, ſo that one end of the ſling may come over the belly, and the other over the nates and back, to be both tied together in a knot upon the ſpine of the os ileum, and afterwards either faſtened to a hook fixed in ſome poſt, or held firm by ſome aſſiſtance: in like manner, at the bottom of the thigh, a little above the knee, there muſt be faſtened another napkin or ſling, or elſe the girt of Hildanus, with a compreſs between it and the thigh; both theſe ſlings being drawn tight, the thigh is to be extended, but that not vehemently but only ſo much as is ſufficient to draw the bone out of its ſinus, that it may be replaced into its proper acetabulum by the ſurgeon's hands; to this purpoſe the ſurgeon is, with one hand, to preſs the head of the thigh-bone outward, while the other conducts the knee inward. Or the reduction may be made by napkins faſtened about the thigh near its extremities, in the manner of ſlings, and the limb extended that way, the knee being at the ſame time preſſed inward by the hands.

If theſe methods are not ſufficient, it will be neceſſary to have recourſe to the polyſpaſton, or pulley, well known to the ſurgeons on theſe occaſions. This is to be the method of reduction of the thigh-bone when it is diſlocated forward; but when it is found to be luxated backward, the patient is to be placed flat on a table, with his face downward; the thigh is then to be extended more ſtrongly than in the former caſe, and the reduction is to be performed by the ſurgeon's hand, an aſſiſtant all the while turning the limb ſomewhat inwards; and by this method the head of the thigh-bone generally ſlips very readily from this ſort of diſlocation into its proper place. The limb is then to be ſecured with proper bandages, and the patient to be kept to his bed for three or four weeks.

THIMBLE, an inſtrument made of braſs, ſilver, iron, &c. put on the finger to thruſt a needle through any cloth, ſilk, &c. uſed by all ſeamſtreſſes, taylors, &c. The common thimbles are generally made of ſhruff and old hammered braſs. This they melt, and caſt in a ſort of ſand, with which and red ochre are made moulds and cores. They are caſt in double rows, and when cold taken out, and cut off with greaſy ſhears. Then the cores being taken out, they are put into a barrel, as they do ſhot, and turned round with a horſe till they rub the ſand one from another: from thence they are carried to the mill to be turned firſt on the inſide and afterwards on the outſide: then ſome ſaw-duſt, or filings of horn-combs, are put half way into each thimble, and upon it an iron-punch; and then with one blow againſt a ſtudded ſteel the hollow of the bottom is made: after this, with an engine, the ſides have the hollow made: this done, they are again poliſhed on the inſide: then the rim is turned at one ſtroke: and laſtly, they are turned in a barrel with ſaw-duſt, or bran, to ſcour them very bright. Iron thimbles, the thouſand, pay, on importation, 11 s. $6\frac{60}{100}$ d. and draw back, on exportation, 4 s. $8\frac{25}{100}$ d. Braſs thimbles, the thouſand, pay, on importation, 14 s. $4\frac{35}{100}$ d. and draw back, on exportation, 12 s. $11\frac{25}{100}$ d.

THINKING, a general name for any act or operation of the mind. See MIND.

Chauvinus, with the carteſians, will have thinking to conſiſt in a certain native inherent motion or agitation of the human mind, whereof itſelf is conſcious; for they conceive it to be no other than the very eſſence of the mind itſelf, or at leaſt its principal and eſſential property. All the materials of thinking are by Mr. Locke derived from the two ſources of ſenſation and reflection. See the articles SENSATION and REFLECTION.

The ſchool philoſophers uſually divide thinking into intellectual and volitive. Intellectual is ſubdivided into perception, judgment, reaſoning, and method. Volitive thinking, or volition, admits of infinite different modifications, or new determinations. See PERCEPTION, JUDGMENT, &c.

The

The doctrine of the carteſians, who maintain that thinking is eſſential to the human ſoul, and that there is no time when the ſoul does not think, is overturned by Mr. Locke, who ſhews, that in ſleep, without dreaming, there is an entire ceſſation of all the modes of thinking. See the article IDEA.

THEONVILLE, a city of Luxemburg, ſituated on the river Moſelle: eaſt long. 6°, north lat. 49° 32′.

THIRD, *tertius*. See NUMBER and NUMERATION.

THIRD, in muſic, a concord reſulting from a mixture of two ſounds, containing an interval of two degrees.

It is called third, as containing three terms or ſounds between the extremes. The third, in Italian *terza*, in French *tierce*, in Latin *tertia*, has no general name in the Greek; it is the firſt of the imperfect concords, *i.e.* of ſuch as admit of majority and minority, without ceaſing to be concords. And hence it is diſtinguiſhed into two kinds. The firſt, which the Italians call *ditono*, from the Greek *ditonos*, or *terza maggiore*, and the greater third, is compoſed diatonically of three terms or ſounds, containing two degrees or intervals, one whereof, in the antient ſyſtem, is a greater tone, and the other a leſſer tone; but, in the modern temperate ſyſtem, they are both equal, as *ut, re, mi*; or *ut, mi*. See the articles INTERVAL and CONCORD.

Chromatically it is compoſed of four ſemitones, two whereof are greater, and the third leſs; it takes its form from the ratio ſeſquiquarta, 4:5.

The ſecond third, which the Italians call trihemituono, or ſemi-ditono, or terza minore, and we leſſer third, is compoſed, like the former, of three ſounds or terms, and two degrees or intervals; but theſe degrees, diatonically, are only a greater tone and ſemi-tone.

Chromatically it is compoſed of three tones, two greater and one leſs; as *re, mi, fa*; or *re, fa*.

It takes its form from the ratio ſeſquiquinta, 5:6.

Both theſe thirds are of admirable uſe in melody, and make, as it were, the foundation and life of harmony.

THIRD POINT, or TIERCE POINT, in architecture, the point of ſection in the vertex of an equilateral triangle.

Arches or vaults of the third point, called by the Italians di terzo acuto, are thoſe conſiſting of two arches of a circle meeting in an angle a-top.

THIRDINGS, in the manor of Turfat, in the county of Hereford, is the third part of the corn or grain on the ground, due to the lord for a heriot, on the death of his tenant. See HERIOT.

THIRSK, a borough-town in the north-riding of Yorkſhire, ſituated on the river Swale, ſixteen miles north-weſt of York. It ſends two members to parliament.

THIRST, *ſitis*, an uneaſy ſenſation, ariſing from a deficiency in the ſaliva to moiſten the inward parts of the mouth; hence ariſe a ſtrong deſire for drink: it is a ſymptom generally attending feveriſh diſorders.

THISTLE, *carduus*, in botany. See the article CARDUUS.

Order of the THISTLE, or *of St.* ANDREW, a military order of knighthood in Scotland, the riſe and inſtitution whereof is variouſly related by different authors: Leſley, biſhop of Roſs, reports, that the night before the battle between Athelſtan king of Northumberland, and Hungus king of the Picts, a bright croſs, in form of that whereon St. Andrew (the tutelar ſaint of Scotland) ſuffered martyrdom, appeared to Hungus, who having gained the victory, ever after bore the figure of that croſs on his banners. Others aſſert, that Achaius king of Scotland, firſt inſtituted this order, after having made the famous league offenſive and defenſive with Charlemagne king of France. But although the thiſtle had been acknowledged as the ſymbol of the kingdom of Scotland from the reign of Achaius, yet ſome refer the beginning of this order to the reign of Charles VII. of France. Others place the foundation of it as low as the year 1500.

The chief and principal enſign is a gold collar compoſed of thiſtles and ſprigs of rue interlinked with amulets of gold, having pendent thereunto the image of St. Andrew with his croſs, and the motto, NEMO ME IMPUNE LACESSET. See plate CCLXXIV. fig. 4. n° 1.

The ordinary or common enſign worn by the knights, is a ſtar of four ſilver points, (*ib.* n° 4.) and over them a green circle, bordered and lettered with gold, containing the ſaid motto, and in the center is a thiſtle proper; all which is embroidered on their left breaſt, and worn with the collar, with a green ribband over the left ſhoulder, and brought under the right arm; pendent thereto is the image of St. Andrew, with

with his croſs, in a purple robe, within an oval of gold enamelled vert, with the former motto: but ſometimes they wear, incircled in the ſame manner, a thiſtle crowned.

About the time of the reformation, this order was dropped, till James II. of England reſumed it, by creating eight knights: however, the revolution unſettled it again, and it lay neglected till queen Anne, in 1703. reſtored it to the primitive deſign, of twelve knights of St. Andrew. King George I. in the firſt of his reign, confirmed the ſtatutes ſigned by queen Anne, with the addition of ſeveral more, among which was that of adding rays of glory to ſurround the figure of St. Andrew, which hangs at the collar: and though from the reformation to George I. both elections and inſtallments had been diſpenſed with, his majeſty ordered that chapters of election ſhould, for the future, be held in the royal preſence; to which end he ordered the great wardrobe to provide the knights brethren, and officers, with ſuch mantles as the ſtatutes of the ſaid order appointed.

THLASPI, TREACLE-MUSTARD, in botany, a genus of the *tetradynamia ſiliculoſa* claſs of plants, the corolla whereof conſiſts of four petals, vertically ovated, and diſpoſed in the form of a croſs; the ſtamina are ſix filaments, about half the length of the cup; the fruit conſiſts of a bilocular pod or capſule, narrowed at the baſe, and emarginated, and containing numerous ſeeds, affixed to two ſutures. See plate CCLXXVII. fig. 1.

This genus comprehends the burſa paſtoris of authors.

The ſeeds of the thlaſpi agree in medicinal virtues with the common muſtard. See the article SINAPI.

THLIPSIS, θλῖψις, a compreſſion of the ſtomach from food, which is offenſive only by its quantity, and not endued with any remarkable quality; or from a conflux of humours, void of acrimony, into the part.

THOMÆANS, THOMEANS, THOMISTS, or *Chriſtians of St.* THOMAS, a people of the Eaſt-indies, who, according to tradition, received the Goſpel from St. Thomas. Upon the arrival of the Portugueſe at Calicut, in their firſt voyage to the Indies, they met with antient chriſtians, who pretended to be deſcended from thoſe converted by St. Thomas. The thomæans being informed of a new people arrived among them, who bore a particular veneration for the croſs, ſent embaſſadors to them, to make an alliance with them, and to ſollicit their aſſiſtance againſt the gentile princes, by whom they were greatly oppreſſed. A mixture of opinions, with a total interruption of paſtors, ſometimes for ſeveral years together, occaſioned that horrible chaos their religion was in, at the arrival of the Portugueſe; for a ſpecimen whereof we ſhall add their manner of celebrating the euchariſt: over their altar was a kind of gallery; and while the prieſt was ſaying the beginning of the office below, a cake of flower of rice was frying in oil, or butter, above; when enough, the cake was let down in a baſket upon the altar, where the prieſt conſecrated it: as to the other ſpecies, for wine they uſed a kind of brandy or arrack, variouſly prepared in that country. Nor was their ordination much more regular; the archdeacon, who was ſometimes more reſpected than the biſhop himſelf, frequently ordained prieſts: their other abuſes were infinite. The Portugueſe, for theſe two laſt centuries, have laboured the reformation of this church, and have employed both the eccleſiaſtic and ſecular power therein: for this end they have called the thomæan biſhops to the council at Goa, have inſtructed, charged them, *&c.* and even ſent them for inſtruction to Portugal and Rome; but finding that they were ſtill apt to relapſe at their return, and that no good was like to be done with them, they reſolved to exclude them once for all, and to appoint an european biſhop in their room. Theſe proceedings have rendered the Portugueſe infinitely odious to the thomæans.

St. THOMAS, a city of the hither India, on the coaſt of Cormandel, three miles ſouth of Fort St. George; ſubject to the Portugueſe.

St. THOMAS is alſo an iſland in the Atlantic ocean, ſituated under the equator, in 8° eaſt long.

St. THOMAS is alſo a town of Guiana, in ſouth America, ſituated on the river Oronoko; ſubject to Spain.

St. THOMAS'S DAY, a feſtival of the chriſtian church, obſerved on Dec. 21. in commemoration of St. Thomas the apoſtle.

St. THOMAS *of Canterbury's day*, a feſtival of the romiſh church, obſerved on Dec. 29. in memory of Thomas Becket archbiſhop of Canterbury, who was murdered, or, as the romaniſts ſay, martyred, in the reign of king Henry II.

St.

St. THOMAS'S HOSPITAL. See the article HOSPITAL.

THOMISM, or THOMAISM, the doctrine of St. Thomas Aquinas, and his followers the thomiſts, chiefly with regard to predeſtination and grace. There is ſome doubt what the true genuine thomiſm is, but there are authors who diſtinguiſh the thomiſm of St. Thomas from that of the dominicans. Others again make thomiſm no other than a kind of janſeniſm diſguiſed: but janſeniſm, it is known, has been condemned by the popes, which pure thomiſm never was: in effect, the writings of Alvarez and Lemos, who were appointed by their order to lay down and defend, before the holy ſee, the dogmata of their ſchool, have ſince been reputed the rule of pure thomiſm. The modern ſchool has abandoned many of the antient thomiſts, whoſe ſentiments and expreſſions appeared to Alvarez too hard; and the new thomiſts, who paſs the bounds marked by theſe two doctors, cannot give their opinions for the ſentiments of the ſchool of St. Thomas, which the pope has forbid being cenſured. Thoſe two authors diſtinguiſh four claſſes of thomiſts: the firſt, which they reject, deſtroys or takes away liberty; the ſecond and third do not differ from Molina; the laſt, which Alvares embraces, admits of a phyſical premotion or predeſtination, which is a complement of the active power, whereby it paſſes from the firſt act into the ſecond, that is, from complete and next power to action. The premotion they hold is offered in ſufficient grace, ſufficient grace is given to all men, and that they have a complete independent, next power not to act, and even to reject the moſt efficacious grace.

THOMISTS, a ſect of ſchool-divines, who maintain thomiſm. See the preceding article.

THORACIC, *thoracicus*, a name given to two branches of the axillary artery, on account of their conveying the blood into ſome parts of the thorax. See THORAX. The thoracic arteries are diſtinguiſhed into upper and lower. There are likewiſe thoracic veins, upper and under, deſtined for the reconveyance of the blood from the thorax to the axillary vein.

THORACIC DUCT, or CHYLIFEROUS DUCT, a very ſlender canal, receiving the chyle from the chyliferous veſſels, and the lymph from the lymphatics, and carrying them to the thorax, and uſually through it to the ſubclavian vein. The beginning of this duct is in the reſervoir or receptaculum chyli, which is ſituated in the left ſide of the upper vertebra of the loins, under the aorta, and the veſſels of the left kidney; the reſt of the duct has ſome reſemblance of a ſack or bag, and is larger and more irregular in its figure. Its end is uſually in the ſubclavian vein; ſometimes in the jugular. In dogs, and many other animals, its progreſs is under the aorta; but in the human body it aſcends along the right ſide of the vertebra of the back, and paſſes between the aorta and the vena azygos, ſometimes with a ſimple trunk, ſometimes divided into two: its breadth, where divided, is about that of a wheat-ſtraw. The beſt method of demonſtrating it in animals, is to feed a dog well, and then to ſtrangle him; and as ſoon as the body is opened, to tie it up with a thread in the breaſt, juſt by the ſubclavian; by this means the ciſtern, or receptacle of the chyle, and the chyliferous veſſels and lymphatics are all expoſed evidently to view at once. In a human body they may alſo be obſerved any time after death, by injecting, according to Salzman, wax, or any fluid, or indeed only by inflating the great lymphatic veſſel, which runs by the left emulgent vein; or otherwiſe, if, according to Henninger, an injection, or barely an inflation, be made into a lacteal of the ſecond order, to be traced out in the middle of the meſentery; or, finally, if the pleura be carefully cut between the aorta and the vena azygos, the duct will uſually be eaſily found there. It is compoſed of a fine, thin, and pellucid membrane, and within it there are valves, as in the lacteals and lymphatics, which prevent the reflux of the chyle. There are more of theſe in the human body than in beaſts; and, finally, there is a ſemilunar valve, cloſing its extremity under the ſubclavian.

The uſe of the thoracic duct is to carry the chyle to the blood, through the thorax, as it receives it from the receptacle, and with it the lymph from the lymphatics.

THORAX, in anatomy, that large part of the body ſituated between the abdomen and the neck. See the articles ABDOMEN and NECK.

The parts of the thorax are of two kinds, the continent or containing, and contained: the continent parts, or thoſe which form the cavity, are either common, or proper; the common continent parts of the thorax are the cuticula, the cutis and the pinguedo. See the article CUTICLE, *&c.*

The continent parts proper or peculiar to the thorax, are theſe; the breaſts, the pectoral muſcles, the intercoſtals, the diaphragm, the pleura; and, finally, the bones; of theſe laſt there are twenty-four ribs, the ſternum, and twelve vertebræ. See the articles BREASTS, PECTORALIS, INTERCOSTALS, DIAPHRAGM, &c.

The contents of the cavity formed by theſe, or the parts contained in the thorax, are the mediaſtinum, the lungs, the heart and its pericardium, with the large veſſels ariſing from it, particularly the trunks of the aorta, and the pulmonary artery of the vena cava and pulmonary vein, the thoracic duct, and, finally, the greater part of the œſophagus. See the articles MEDIASTINUM, LUNGS, HEART, PERICARDIUM, &c.

The uſes of the parts of the thorax in general, are their ſerving to reſpiration and the circulation of the blood, in both ſexes; and in women, to the producing milk. See the articles RESPIRATION, CIRCULATION, and MILK.

Wounds of the THORAX, are, by Heiſter, divided into three ſorts. The wound is inflicted either upon the external parts of the thorax; or elſe it penetrates into the cavity of the thorax, without injuring any of its contents; or, laſtly, the contents of the thorax alſo partake of the wound. That the wound terminates in the exterior parts, and does not penetrate into the cavity of the thorax, may be diſcovered by ſeveral methods, as by the ſight, by hearing whether any ſound proceeds from the wound at the time of inſpiration, by feeling whether the finger or probe meets with any reſiſtance in attempting to paſs it into the cavity of the thorax; by injecting warm water, which, in this caſe, will return upon you; by the abſence of bad ſymptoms, which always attend a wound that penetrates. When, by theſe methods, you are fully ſatisfied that it does not penetrate, it may be dreſſed with a digeſtive ointment, or ſome vulnerary balſam, and treated according to the method directed in the cure of ſlight wounds. See the article WOUND.

But when the wound penetrates into the thorax, and a large quantity of blood falls into the cavity thereof, then the office of reſpiration, and the courſe of the blood through the lungs, will certainly be impeded; and the blood, by frequent delays and obſtructions, being entirely inſpiſſated in the lungs, life can no longer be ſupported: but where the quantity of extravaſated blood is not large enough to obſtruct the lungs in their office, the chief danger that the patient labours under, is that the extravaſated blood ſhould putrify by degrees, and corrupt the contents of the thorax, which will bring on very bad ſymptoms, and in a ſhort time death. The following ſymptoms diſcover an extravaſation of blood in the thorax: if there is a great difficulty of breathing except when the patient is placed in an erect poſture; if the patient lies eaſieſt upon his back, or wounded ſide; if he feels a weight upon the diaphragm; if he perceives the undulation of a fluid upon turning the body round; and, laſtly, if there has been little or no diſcharge of blood by the wound. When it appears by theſe ſymptoms that there is a collection of blood in the thorax, the greateſt diligence is required to get it out; therefore when the wound is inflicted upon the middle or lower part of the thorax, and has not a very narrow opening, it will be convenient to lay the patient upon the wounded ſide, adviſing him to fetch his breath as deep as he can, or to cough. If the current of blood is obſtructed by any thick grumous parts, they muſt be removed with a probe or the finger, or drawn out with a ſyringe. If the blood is become too thick to flow out of the wound, attenuating injections muſt be uſed, made of a decoction of barley-water, with the addition of ſome common honey, or honey of roſes, and a ſmall quantity of ſoap; this is to be injected into the cavity of the thorax, and then the patient is to be ſo ſituated as to let it run out again: this operation is to be repeated, till it appears that all the grumous blood is waſhed away. But if the wound is ſo narrow or oblique, that this method cannot be proſecuted, the wound ſhould be enlarged, being careful not to fatigue the patient too much, by endeavouring to diſcharge all the extravaſated blood at one time, keeping the wound open, dreſſing it with proper plaſters and compreſſes, ſecuring the whole with a ſcapulary, and repeating this method of dreſſing, till the diſcharge ſhall entirely ceaſe, and the external wound can be conveniently healed. When a wound is made in the upper part of the breaſt, no poſture will ſatisfy the intention of diſcharging the extravaſated blood, but ſtanding upon the head; an opening ought therefore to be made in the lower part of the thorax, called paracenteſis. See PARACENTESIS.

The cavity of the thorax being thus cleanſed, the wound is to be dreſſed but once every day: each dreſſing ſhould be performed with all poſſible expedition, and the utmoſt diligence ſhould be uſed to guard the contents of the thorax from the external air. At the time of dreſſing, a chaffing-diſh of hot coals ſhould be held near the wound, to warm and thin the air; and if too great a quantity of air is already got into the cavity of the thorax, it muſt be drawn out with a ſyphon. When any of the contents of the thorax are wounded, as the heart, the aorta, the vena cava, the pulmonary artery or vein, the mediaſtinum, or a large portion of the lungs, death comes too ſuddenly to give the ſurgeon room to exerciſe his art. On the other hand, when the lungs are only ſlightly wounded, that is, when only the ſmall ramifications of the pulmonary vein and aſpera arteria are divided, the caſe is very dangerous, but not always mortal; though perſons who recover after wounds of this kind, are more obliged to the ſoundneſs of their conſtitution, than their ſurgeon's ſkill.

THORN, a city of Poland, in the province of regal Pruſſia, ſituated on the river Viſtula eaſt long. 19°, and north lat. 52° 40'.

THORNBACK, in ichthyology, the prickly raia, with tuberculoſe teeth, and a tranſverſe cartilage in the belly. See the article RAIA.

The head and body are very flat and depreſſed; the figure of the body, excluſive of the tail, is nearly ſquare; the tail is long and ſlender, but a little depreſſed or or flatted; the belly is altogether plane; the back in general is plane, but riſes a little in the middle into a convexity; the eyes ſtand on the uppermoſt part of the body, at a conſiderable diſtance from the roſtrum, and are a little protuberant, and covered with a ſimple and naked ſkin; behind each eye there is a ſingle oblong foramen, that runs tranſverſely, and its anterior ſide is ſtriated, and ſerves as a valve to cloſe up almoſt the whole aperture; the mouth is ſituated on the under ſide of the body, and lies in a tranſverſe direction, is very large, and ſtands at the ſame diſtance from the extremity of the roſtrum as the eyes do.

THORNBURY, a market-town of Gloceſterſhire, ſituated twenty miles ſouth-weſt of Gloceſter.

THORNEY-ISLAND, an iſland made by the branches of the Thames formerly, where Weſtminſter-abbey now ſtands.

THORNEY-ISLAND is alſo an iſland ſituated in a bay of the Eaſt channel, between Chicheſter and Portſmouth.

THOUGHT, or SENTIMENT, a general name for all the ideas conſequent on the operations of the mind, and even for the operations themſelves. See the articles IDEA and THINKING.

THOULON, or TOULON, a port-town of Provence, in France, ſituated on a bay of the Mediterranean ſea: eaſt lon. 6°, and north lat. 43° 5'.

THOULOSE, or TOULOSE, a city of France, capital of the province of Languedoc, ſituated on the river Garonne: eaſt long. 1° 5', and north lat. 43° 40'.

THRACE, a province of european Turky, ſituated on the north ſide of the Propontis.

THRASHING, or THRESHING, *flagellatio*, in agriculture, the art of beating the corn out of the ears. See CORN.

There are two ways of ſeparating corn from the ear; the firſt by beating it with a flail, which is properly what is called thraſhing. The other method, ſtill practiſed in ſeveral countries, is to make mules, or horſes, trample on it, backwards and forwards; this is properly what the antients called tritura and trituratio. The Hebrews uſed oxen therein, and ſometimes yoked four together for this purpoſe. Another way among the antients was with a kind of ſledge, made of boards joined together, and loaden with ſtones or iron, upon which a man was mounted, and the whole drawn over the corn by horſes: this inſtrument was called traha, or tribula. It is a rule among huſbandmen, that the ſeaſon for thraſhing, is as ſoon as the corn has ſweated in the heap or mow.

THRAVE, or THREAVE *of corn*, twenty-four ſheaves, or four ſhocks of ſix ſheaves to the ſhock; though, in ſome countries, they only reckon twelve ſhocks to the thravé.

THREE, *Rule of*. See the article RULE.

THRENODY, *threnodia*, a mournful or funeral-ſong.

THRICHECHUS, the SEA-COW, in zoology, a genus of ſea-animals, of the order of the plagiuri, the characters of which are, that it has teeth in both jaws; there is no fin upon the back, and the ſkin is very tough, firm, and hairy.

This

This creature ſeems to be the link uniting the fiſh and the quadruped-tribes, as the bat does the quadrupeds and birds: it grows to fifteen feet, or more, in length, and is conſiderably thick in proportion. The females have, between the pectoral fins, two large, round, and fair breaſts, and both ſexes have the parts of generation and the navel perfectly reſembling thoſe of the human ſpecies: there is no doubt, but all the fables concerning mermaids, mermen, and ſyrens, took their riſe from an imperfect view of this animal.

THRIPS, in the hiſtory of inſects, a genus of the order of ſcleroptera, having the roſtrum obſcure, the body of a linear figure, and the wings four in number, being incumbent on the back, and ſtrait. It is an extremely ſmall inſect, not equal to a flea in ſize.

THROAT, the anterior part of an animal, between the head and the ſhoulders, wherein is the gullet. See the article OESOPHAGUS.

For diſeaſes of the throat, ſee the articles QUINSEY, TONSILS, *&c.*

THROAT, in architecture, fortification, *&c.* See the article GORGE.

THRONE, θρόνος, a royal ſeat, or chair of ſtate, enriched with ornaments of architecture and ſculpture, made of ſome precious matter, raiſed on one or more ſteps, and covered with a kind of canopy. Such are the thrones in the rooms of audience of kings, and other ſovereigns.

THROWSTER, one who prepares raw ſilk for the weaver, by cleanſing and twiſting it.

THRUSH, in ornithology, two ſpecies of turdus, the one called the common thruſh, and the other the miſſel-thruſh. See the article TURDUS.

The common thruſh is the turdus with a white line over the eyes. This is ſmaller than the fieldfare; the head is ſmall and flatted; the eyes are bright, their iris hazel; the ears patulous; the beak about half an inch long, brown, and pointed; the head and back of an olive brown, ſpotted with a dark colour; the breaſt is yellow, the belly whitiſh, and the legs brown.

The other ſpecies of turdus, called the miſſel-thruſh, is of a greyiſh yellow colour with a ſpotted breaſt, being the largeſt of the turdus-kind.

THUIN, a town of the county of Namur, ſituated on the river Sambre, near the confines of Hainault, nine miles ſouth-weſt of Charleroy.

THULE, of the antients, ſuppoſed to be the iſlands of Orcades.

THUMB, *pollex*, in anatomy, one of the parts or extremities of the hand. See the article HAND.

The thumb, conſidered ſeparately, has bones thicker than thoſe of the fingers; the firſt of theſe agree in all reſpects with thoſe of the metacarpus, in figure, ſituation, and articulation; but in its motion it is widely different. The articulation of the firſt with the ſecond, and of the ſecond with the third, are like the articulations and motions of the ſecond and third phalanges of the other fingers. See the articles FINGERS and PHALANX.

THUMMIM, in the ſcripture-learning. See URIM and THUMMIM.

THUNDER, a noiſe in the regions of the air, excited by a ſudden kindling of ſulphureous exhalations.

Thoſe philoſophers who maintain, that vapours are buoyed up in the air by particles of fire adhering to them, account for the phænomena of thunder and lightning in the following manner: they ſuppoſe that from the particles of ſulphur, nitre, and other combuſtible matter, which are exhaled from the earth, and carried into the higher regions of the atmoſphere, together with the aſcending vapours, is formed an inflammable ſubſtance, which, when a ſufficient quantity of fiery particles is ſeparated from the vapours, by the colliſion of two clouds, or otherwiſe, takes fire, and ſhoots out into a train of light, greater or leſs, according to the ſtrength and quantity of the materials. This opinion is certainly falſe; for it is impoſſible the vapours ſhould be attended with ſuch fiery particles as is here ſuppoſed: neither have we occaſion to fly to ſuch an hypotheſis; for as vapours, exhaled from the ſurface of the water, are carried up into the atmoſphere, in like manner the effluvia of ſolid bodies are continually aſcending thither. Now we find, by experiment, that there are ſeveral inflammable bodies, which, being mixed together in due proportion, will kindle into flame by fermentation alone, without the help of any fiery particles. See the articles FERMENTATION, LIGHTNING, *&c.*

Thus, M. Lemery having covered up, in the earth, about fifty pounds of a mixture, compoſed of equal parts of ſulphur and filings of iron, tempered with

water; after eight or nine hours time the earth, where it was laid, vomited up flames. Thus alſo, mix a ſmall quantity of gun-powder with oil of cloves, pour gently upon this mixture two or three times as much ſpirit of nitre, and you will obſerve a bright inflammation ſuddenly ariſing from it. A mixture of the two fluids alone will take fire, the powder is added only to augment the inflammation. When, therefore, there happens to be a mixture of the effluvia of ſuch bodies floating in the air, they ferment, kindle, and, flaſhing like gun-powder, occaſion thoſe exploſions and ſtreams of fire, which we call thunder and lightning.

As to the particular ſpecies of the effluvia, which compoſe this mixture, that cannot be exactly determined: they are thought to be chiefly ſulphureous and nitrous; ſulphureous, becauſe of the ſulphureous ſmell which lightning generally leaves behind and of that ſultry heat in the air, which is commonly the forerunner of it; nitrous, becauſe we do not know of any body liable to ſo ſudden and violent an exploſion as nitre is.

Dr. Liſter is of opinion, that the matter both of thunder and lightning, and alſo of earthquakes, is the effluvia of the pyrites; as he does, that the matter of vulcanos is the pyrites itſelf. This is a mineral that emits copious exhalations, and is exceeding apt to take fire upon the admiſſion of moiſture. See the doctor's defence of his notion in the Phil. Tranſ. n° 157. He thinks this may be the reaſon why England is ſo little troubled with earthquakes, and Italy, and almoſt all places round the Mediterranean ſea, ſo very much, *viz.* becauſe the pyrites are rarely found in England; and, where they are, they lie very thin, in compariſon of what they do in thoſe countries; as the vaſt quantity of ſulphur emitted from the burning mountains there, ſeems to ſhew.

The effects of thunder and lightning are owing to the ſudden and violent agitation the air is put into thereby, together with the force of the exploſion; and not to thunderbolts falling from the clouds, as is ſuppoſed by the vulgar.

Some are inclined to think, that thunderbolts are artificial, and that they were applied by the antients to ſome uſe. What confirms them in their opinion is, that they are found more frequently where ſepulchres have been, than in other places.

The diſtance the thunder is from us, may nearly be eſtimated by the interval of time between our ſeeing the lightning, and hearing the thunder; for as the motion of light is ſo very quick, that the time it takes up in coming to us from the cloud, is not perceptible; and as that of a ſound is about a thouſand feet in a ſecond; allowing a thouſand feet for every ſecond that paſſes between our ſeeing the one, and hearing the other, we have the diſtance of the cloud, pretty nearly, from whence the thunder comes. See the article LIGHT and SOUND.

THURINGIA LANGRAVATE, one of the diviſions of the circle of upper Saxony, in Germany, having the dutchy of Magdeburg on the north, and Franconia on the ſouth.

THURSDAY, the fifth day of the chriſtian week, but the ſixth day of that of the Jews. See DAY and WEEK.

Holy THURSDAY, the ſame with aſcenſion-day. See the article ASCENSION.

Maunday-THURSDAY. See the article MAUNDAY-THURSDAY.

THURSO, a port-town of Cathneſs, in Scotland, ſituated on the Caledonian ocean, fifteen miles ſouth-weſt of Dungſby-head.

THUYA, *arbor vitæ*, in botany, a genus of the *monoecia-monadelphia* claſs of plants, having no corolla; the fruit is an ovato-oblong obtuſe cone, opening longitudinally, with oblong ſquamæ almoſt equal, obtuſe and convex on the outſide.

THYMBRA, in botany, the ſame with the ſatureia. See SATUREIA.

THYMELÆA, in botany, the ſame with daphne. See the article DAPHNE.

THYMUS, in botany, a genus of the *didynamia-gymnoſpermia* claſs of plants, the corolla of which conſiſts of a ſingle ringent petal; the tube is of the length of the cup; the faux is ſmall; the upper lip is ſhort, plane, erect, emarginated, and obtuſe; the lower lip is long, patent, trifid, obtuſe, and broader in the middle laciniæ; there is no pericarpium; the ſeeds are four, ſmall and roundiſh, and are contained in the cup.

This genus, among other ſpecies, comprehends the herb maſtich, the common garden-thyme, the cretic thyme, the common wild thyme, *&c.*

The common thyme has an agreeable aro-

matic

Fig. 2. THYMUS.

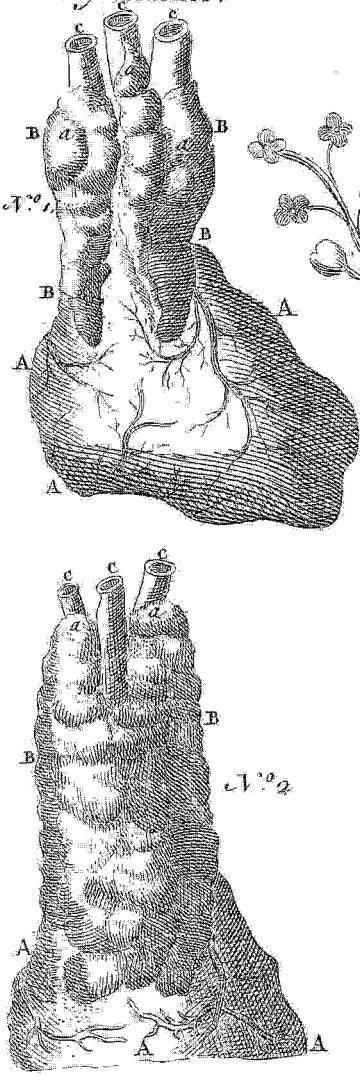


Fig. 1. THLASPI

Fig. 3. The TIGER.

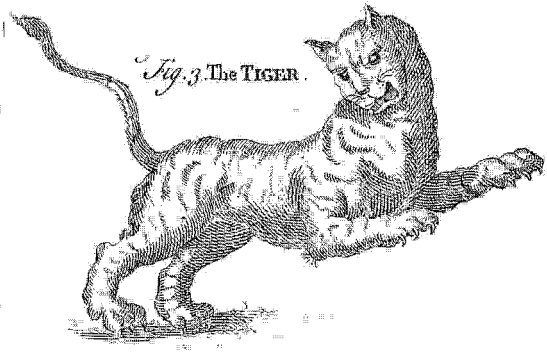
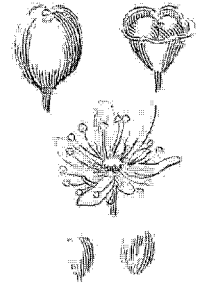


Fig. 4. TILIA.



J. Jefferys sculp.

matic ſmell, and a warm pungent taſte, which it imparts by infuſion to rectified ſpirit, and ſends over, in diſtillation with water; along with the water ariſes an eſſential oil, extremely hot and pungent; this diſtilled ſpirit is an agreeable aromatic cordial liquor, not inferior to any thing of this kind.

THYMUS, in anatomy, a gland, which in infants is very remarkable: it is ſituated in the upper part of the thorax, immediately under the ſternum, and lies upon the pericardium, and on the trunk of the aorta, and of the vena cava. It extends itſelf from the pericardium, along the trunk of the aorta, to the beginning of the carotids, ſometimes ſo far as to the thyroide-gland; its figure is irregular and uncertain; its colour in infants is pale red, in adults it is of a duſkier hue: it is much larger in infants newly born, than in ſubjects at any more advanced period. Its length is there no leſs than three fingers breadth, and its diameter two, its thickneſs is about half a finger: it gradually decreaſes from this ſize, as the child grows up; in adults it is very ſmall, and in old people it entirely diſappears. Its ſubſtance is glandulous and conglomerate, and it is ſurrounded by a membrane. It has blood-veſſels ſometimes from the ſubclavians, ſometimes from the mammary, and ſometimes from the mediaſtine ones; and in ſome ſubjects from the carotids and jugulars. Its lymphatics ſometimes run to the thoracic duct, ſometimes to the ſubclavian veins; and they have in general no valves. The nerves of the thymus are from the par vagum, or from the intercoſtals. There is ſometimes a milky juice found in this gland, in new-born ſubjects. It has no excretory duct hitherto diſcovered, and its uſe is therefore not certainly known: poſſibly, according to Heiſter, it ſerves to ſecrete lymph, which it diſcharges into the thoracic duct, for the dilution of the blood and of the chyle, as the glands of the meſentery and of the pancreas do, in regard to the chyle. On this ſuppoſition its uſe is much greater in the fœtus, than at any time after the birth, becauſe the want of reſpiration in that ſtate may well be ſuppoſed to ſubject the blood to be thicker, and to need more dilution than afterwards; nothing tending to attenuate blood ſo much as reſpiration. Bellinger is of opinion, that it prepares a nutritious fluid for the fœtus while in the uterus, and conveys it by particular ducts to its mouth: but it is to be obſerved, that neither Bellinger himſelf, nor any body ſince, have ever been able to find out theſe ducts. See the article FOETUS.

That our readers may be enabled to form a diſtinct idea of this remarkable gland, we have given two views of it, as found in two fœtuſes, juſt born; ſee plate CCLXXVII. fig. 2. n° 1. and 2. where AA is the heart, ſurrounded by its pericardium; BB, the gland thymus, divided in the upper part into two or three portions, *aa*; CCC, the three aſcending branches of the aorta.

THYMUS, in medicine, is uſed for a kind of wart growing on the parts of generation, the fundament, and ſeveral other parts of the body. See CONDYLOMA, WART, WEN, &c.

The ordinary method of curing a thymus, is by ligature and deſiccative lotions, or by cauſtics; and if large, by inciſion, taking care firſt to ſecure the greater veſſels, by tying them.

THYROARYTÆNOIDES, in anatomy, a muſcle of the larynx, which, ariſing and terminating in it, ſerves, together with the arytenoides, to conſtringe it. Theſe two muſcles mutually interſect one another, and ſtraiten the glottis; ſometimes there is but one muſcle; and ſometimes it is different from that deſcribed here.

THYROIDE GLAND, in anatomy, is of a very ſingular figure, reſembling that of the new moon. It adheres by its middle part, which is called by authors its iſthmus, to the upper ring of the trachea, and its points or horns are turned upwards. It adheres on each part to the larynx and œſophagus.

THYROIDE CARTILAGE, one of the five cartilages that principally compoſe the larynx. The thyroide is the firſt of theſe cartilages, and is alſo called the ſcutiform cartilage, being of a quadrangular figure, and ſtanding in the anterior part, where the pomum Adami, as it is uſually called, makes its prominence, and the largeſt of the other five cartilages.

THYRSUS, in antiquity, the ſceptre which the poets put into the hand of Bacchus, and wherewith they furniſhed the menades in their bacchanalia. See the article BACCHANALIA.

The thyrſus was originally a lance or ſpear wrapped up in vine-leaves, wherewith Bacchus is ſaid to have armed himſelf and his ſoldiers in the Indian wars,

to

to amuſe and deceive the unpractiſed Indians, and make them expect no hoſtilities.

Hence, it was afterwards borne in the feaſts and ſacrifices of that god; and as the ſatyrs, who were Bacchus's ſoldiers, were ſuppoſed to have fought with it, it became a cuſtom to repreſent them therewith.

THYSSELINUM, in botany, the ſame with the ſelinum of Linnæus. See the article SELINUM.

TIARA, an ornament or habit wherewith the antient Perſians covered their head, and which the Armenians, and kings of Pontus, ſtill wear on medals; theſe laſt, becauſe deſcended from the Perſians.

TIARA is alſo the name of the pope's triple crown; antiently called regnum.

TIBER, a great river of Italy, which runs through the pope's territories, paſſing by Perugia and Orvietto; and having viſited Rome, falls into the Tuſcan ſea at Oſtia, fifteen miles below that city.

TIBIA, in anatomy, is the inner and bigger bone of the leg, called alſo focile majus: it is hard and firm, with a cavity in its middle; it is almoſt triangular; its fore and ſharp edge is called the ſhin.

In its upper extremity it has two large ſinuſes, tipped with a ſoft and ſubtile cartilage, called cartilago lunata, from its figure. It runs in between the extremities of the two bones, and becomes very thin at its edge, like thoſe in the articulation of the lower jaw. It facilitates a ſmall ſide motion of the knee. The ſinuſes receive the two protuberances of the thigh-bone, and the production which is between the ſinuſes of the tibia, is received in the ſinus, which divides theſe two protuberances of the femur. By bending our knee, we bring our leg, in walking, in a ſtraight line forwards, which, without this articulation, we could not have done: but, like thoſe who have the misfortune to have a wooden leg, we muſt have brought our foot about in a ſemicircle, in going even upon a plain, but more evidently upon a deſcent. On the ſide of this upper end it has a ſmall knob, which is received into a ſmall ſinus of the fibula; and, on its fore part, a little below the patella, it has another, into which the tendons of the extenſors of the leg are inſerted. Its lower extremity, which is much ſmaller than its upper, has a remarkable proceſs which forms the inner ancle, and a pretty large ſinus divided in the middle of a ſmall protuberance; the ſinus receives the convex head of the ſame bone. It has another ſhallow ſinus in the ſide of its lower end, which receives the fibula.

The tibia has four extenſor muſcles, as the rectus, cruralis, vaſtus, &c. and five flexors, *viz.* the gracilis, ſemi-membranoſus, ſemi-nervoſus, biceps, and poplitæus. See the article RECTUS, &c.

TIBIALIS, or TIBIÆUS, in anatomy, the name of two muſcles of the foot, diſtinguiſhed by the epithets anticus and poſticus. The tibialis anticus, one of the flexor muſcles, has its origin from the ſuperior and extenſor ſurface of the tibia, and is terminated at the internal os cuneiforme, and the interior part of the internal metatarſal bone. The tibialis poſticus, or adductor-muſcle of the foot, has its origin in the upper part of the interoſſeous ligament, and its termination in the os naviculare. See the articles FOOT and MUSCLE.

TIBICEN, in ichthyology, the ſame with the lyra, or harp-fiſh, a ſpecies of trigla. See LYRA and TRIGLA.

TIBISCUS, a river otherwiſe called Teiſs. See the article TEISS.

TICK-TACK, a game with dice and tables, wherein all the men are placed on the ace-point.

The great art of this game conſiſts in ſecuring the ſice and cinque-point; which ought never to be broken, unleſs for the advantage of going in, or a hit, which laſt is, when you throw ſuch a caſt that ſome of your men will reach your adverſary's unbound.

Playing cloſe at home is the ſafeſt way; taking care to find your men, and giving your adverſary a ſingle game, when in danger of loſing a double one.

TICKHILL, a market-town in the weſt riding of Yorkſhire, thirty three miles ſouth of York.

TICKLING, ſays M. le Cat, is, in reſpect to the ſenſe of feeling, what an hermaphrodite is in reſpect to ſexes: it partakes equally almoſt of pleaſure and pain; making one laugh, at the ſame time that it is intolerable; and if carried too far, frequently has bad and even fatal effects. In this ſenſation, the organs of feeling are affected with a light tremulous motion, which occaſions all voluptuous ſenſations; but more lively in its degree, and ſmarter, than that which uſually attends on pleaſure: it proceeds from that gentle

TIDES

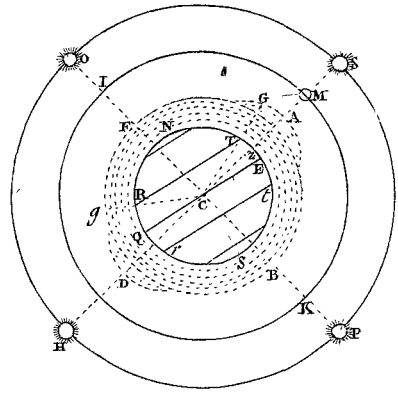


Fig. 1.

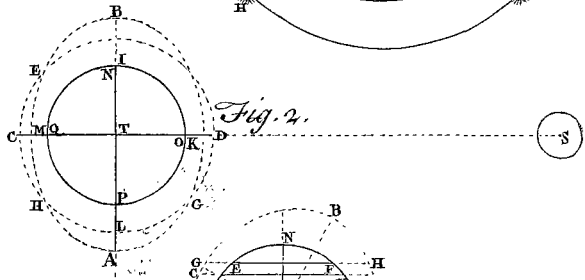


Fig. 2.

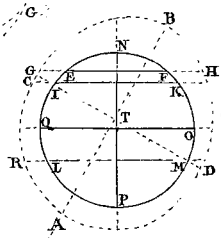


Fig. 3.

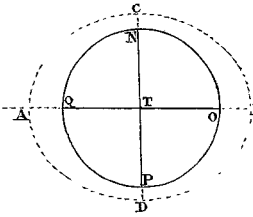


Fig. 4.

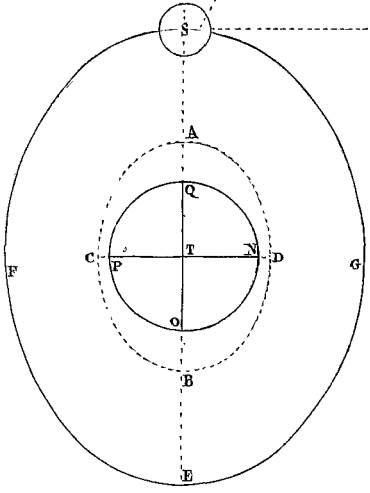


Fig. 5.

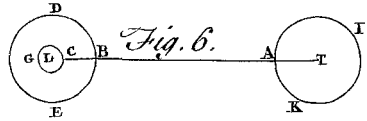


Fig. 6.

J. Jefferys sculp

gentle friction, which is diſtinguiſhed from all other impreſſions on the organs, by the name of titillation.

TIDDESWAL, a market-town of Darbyſhire, eighteen miles north-weſt of Darby.

TIDES, two periodical motions of the waters of the ſea, called the flux and reflux, or the flow and ebb.

The cauſe of the tides is the attraction of the ſun and moon, but chiefly of the latter; the waters of the immenſe ocean, forgetful, as it were, of their natural quietus, move and roll in tides, obſequious to the ſtrong attractive power of the moon, and weaker influence of the ſun. See the articles ATTRACTION and GRAVITATION.

To illuſtrate this, let NESQ (plate CCLXXVIII. fig. 1.) repreſent the earth, covered over with water ABDF; NS the axis of the earth, EQ the equator, TR the tropic of cancer, *tr* the tropic of capricorn, M the moon in her orbit, S the ſun in his. Now ſince all bodies are endued with an attracting virtue, the moon will attract all the water in the neareſt hemiſphere FAB, with degrees of force which are inverſely as the ſquares of the diſtances from all parts; and therefore with the ſtrongeſt force where the diſtance is leaſt, *viz.* in the point A, directly under her: and this attraction being in this hemiſphere contrary to that of the earth, the water in all parts from B to F towards A will have its gravity decreaſing, and be higheſt of all at the part A; and conſequently muſt there ſtand higher than at the point F, where being more attracted by the earth, it muſt be heavier and nearer to the center, as is evident from the laws of hydroſtatics. See the article FLUID.

Again, in the hemiſphere FDB, the attraction of the moon conſpires with that of the earth; but decreaſing as the ſquares of the diſtances increaſe, the joint force of attraction will every where decreaſe from F and B towards D, the point oppoſite to the moon; where, again, the waters will be lighteſt, and therefore ſtand higheſt to preſerve the equilibrium. Whence it appears, that by this ſum and difference of the moon's and earth's attraction, there will neceſſarily enſue a protuberance or ſwelling of the waters, which we call tides of flood, in the two points A and D directly under the moon. Alſo in the two points F and B, as the waters are there moſt attracted, ſo they will be heavieſt, and conſequently riſe to the leaſt height from the earth's ſurface, whence they are called tides of ebb, or the ebbing of the water.

If to the power of the moon we add that of the ſun, we ſhall have the tides conſiderably augmented at the conjunction in S, or oppoſition in H, that is, at the new and full moons, which are called the ſpring-tides; as thoſe which happen when the ſun is at O or P, are called neap-tides, the waters at A and D being then loweſt, becauſe the attraction of the moon is then counterballanced by that of the ſun.

It is farther to be obſerved, that of the two tides of flood at A and D, that at A is greateſt to any place T in northern latitude, when the moon is in the northern ſigns, and above the horizon: for the point A is then nearer the zenith of the place G, than the oppoſite point D is to the ſame place at R twelve hours afterwards; and, conſequently, the height of the tide TG is greater than that of the oppoſite tide R*g*. The contrary of this happens, when the moon is in the ſouthern ſigns.

That there are two tides of flood, and two of ebb, ſucceeding each other alternately at about the interval of ſix hours, is obvious from the figure: and that they happen later each day near an hour, is owing to their exact correſpondence to the motion of the moon, which daily culminates ſo much later. That they happen not when the moon is in the meridian, but about three hours after, is owing to the force of the moon being then greater than when in the meridian of any place; as the heat of the day is greater at three o'clock than at twelve; and the heat of the ſummer is greater in Auguſt, than at the 21ſt of June. Laſtly, that the greateſt ſpring-tides happen not at the 21ſt of March, and 23d of September, but in February and October, is becauſe the ſun being neareſt the earth in December, his influence is then ſtrongeſt, and ſo muſt quicken the time of the greateſt vernal tides; and being weakeſt in June, the time of the autumnal tides will neceſſarily be retarded.

The ſum of what has been ſaid is this: if NOPQ (*ibid.* fig. 2.) be the ſurface of the earth, T its center, IFKGLHCE a circle repreſenting the ſpherical ſurface of the waters covering the earth, and affected only by the attractive power of the earth: upon placing an attracting body at S, the waters will no longer

continue

continue their ſpherical figure, but be immediately drawn into the ſpheroidical figure ACBD, in ſuch manner, as to be depreſſed at C and D to M and K, and elevated from L and I to A and B; and the elevation AL or BI, is double the depreſſion CM or DK. That if S be the ſun, then AP—OK=AL+KD =25 inches; or 11½ feet, if S be the moon. That at the points E, F, G, H, (which are called the octants) the water is neither elevated nor depreſſed. That if any other body be placed at O (as the moon) in the ſame right-line TS; then by the joint influence of both S and O, the elevation at A and B will be increaſed, and the depreſſion at C and D likewiſe. Laſtly, if S be in the ſituation *s*, or vertical to the point D, it is plain its action to raiſe the water D will be directly contrary to that of the moon in depreſſing it there; wherefore the depreſſion will not be ſo great as before; for the ſame reaſon the elevation at A and B will be diminiſhed, being now only as the difference of the two forces, whereas before they were as the ſum.

We ſhall now conſider the phænomena of the tides which remain; and firſt, it is evident, that if PN be the axis of the earth, and QO the diameter of the equator, then the moon ſituated at O, over one of the poles, would accumulate the water over each pole, and the ſpheroid would be ſo poſited as to have its longeſt axis AB coinciding with the axis of the earth PN. In this poſition of the ſpheroid, it is plain, there could be no ſuch thing as a tide in any part of the ocean over all the earth; for every ſection of the ſpheroid, parallel to the equator, would be a circle; conſequently in any parallel of latitude, the water would be at an equal diſtance from the earth's ſurface every moment of the diurnal revolution, or natural day.

Suppoſe the moon were removed from the direction of the earth's axis, and poſited at S (*ibid.* fig. 3.) then will the axis of the aqueous ſpheroid AB be turned towards S, and make an angle with the earth's axis, as ATP or BTN. Then we obſerve, that ſince C, D, are the places of loweſt water, that parallel IK which paſſes through the point I on one ſide the equator, and LM which paſſes through M on the other, will divide the earth into three zones, in two of which, *viz.* ENK and LPM, there will be but one tide each day, of the ſame kind; for inſtance, in the parallel EF, a perſon at F will have high water, and at E low water for twelve hours after. Again, in all the zone IKML, there will be two tides of the ſame kind each day, as is evident from the figure. Theſe limits, or the arch QI or OM, is the complement of the moon's declination from the equator.

If the moon at S (*ibid.* fig. 4.) be over the equator, the longer axis of the ſpheroid AB will now coincide with the plane of the equator QO, and the ſhorter axis CD with the axis of the earth NP. Here it is obvious, that in this ſituation of the ſpheroid, the waters in the parts AB, with reſpect to thoſe at CD, will give the greateſt difference of high and low water poſſible to all parts of the earth; and that there is no place but thoſe two at the poles N, P, but what has two tides of flood, and two of ebb every twenty-four hours. And this difference of the flux and reflux will decreaſe from the equator to the poles.

It has been already obſerved, that the greateſt elevation of the waters is not when the luminary is in the meridian, but about three hours after, becauſe the motion communicated to the waters during the arrival of the meridian is not immediately deſtroyed, but remains ſome time, and receives a farther augmentation from that which is impreſſed for about three hours after. For the ſame reaſon, we obſerve, the greateſt and leaſt tides happen not on the day of the ſyzygy, or quadrature, but on the third or fourth after; the ſum or difference of the forces of the luminaries not being till then at a maximum. See the article SYZYGY.

Let SFEG (*ibid.* fig. 5.) be the orbit of the moon about the earth QNOP, which as it is not circular but elliptical, the center of the earth T will not be always at an equal diſtance from the moon; but the moon will be ſometimes neareſt the earth, as when at S, and ſometimes fartheſt off, as at E. The point S is called the perigæum, or perigee; and the point E the apogæum, or apogee. The power of the moon in her perigee is to that in the apogee nearly as TE^3 to TS^3; and conſequently the greateſt tides will be on the day of the perigee, or rather a few days after, for the reaſons above-mentioned. Such would the tides regularly be, if the whole earth were covered with deep ſea; but by reaſon of the ſhoalneſs of ſome places, and the narrowneſs of the ſtreights, by which the tides are, in many places, propa-

propagated, there ariſes a great diverſity in the tides, not to be accounted for without an exact knowledge of all the circumſtances of the ſeveral places where they happen; as of the poſition of the land, the breadth and depth of channels, &c.

That the tides may have their full motion, the ocean in which they are produced ought to be extended from eaſt to weſt 90°, or a quarter of a great circle of the earth, at leaſt; becauſe the places where the moon raiſes moſt, and moſt depreſſes the water, are at that diſtance from one another. Hence it appears, that it is only in the great oceans that ſuch tides can be produced; and why, in the large Pacific ocean, they exceed thoſe in the Atlantic ocean. hence alſo it is obvious, why the tides are not ſo great in the torrid zone, between Africa and America, where the ocean is narrower, as in the temperate zones on either ſide; and from this alſo, we may underſtand why the tides are ſo ſmall in iſlands, that are very far diſtant from the ſhores. It is manifeſt, that, in the Atlantic ocean, the water cannot riſe on one ſhore but by deſcending on the other; ſo that, at the intermediate diſtant iſlands, it muſt continue at about a mean height betwixt its elevation on the one and on the other ſhore.

As the tides paſs over ſhoals, and run through ſtreights into bays of the ſea, their motion becomes more various, and their height depends on a great many circumſtances. The tide, that is produced on the weſtern coaſt of Europe, correſponds to the theory above deſcribed: thus, it is high water on the coaſt of Spain, Portugal, and the weſt of Ireland, about the third hour after the moon has paſſed the meridian: from thence it flows into the adjacent channels, as it finds the eaſieſt paſſage. One current from it, for example, runs up by the ſouth of England, and another comes in by the north of Scotland: they take a conſiderable time to move all this way, and it is high-water ſooner in the places to which they firſt come; and it begins to fall at thoſe places, while the two currents are yet going on to others that are farther in their courſe. As they return, they are not able to raiſe a tide; becauſe the water runs faſter off than it returns, till, by a new tide propagated from the ocean, the return of the current is ſtopped, and the water begins to riſe again. The tide takes twelve hours to come from the ocean to London-bridge, ſo that, when it is high water there, a new tide is already come to its height in the ocean; and, in ſome intermediate place, it muſt be low water at the ſame time. In channels, therefore, and narrow ſeas, the progreſs of the tides may be, in ſome reſpects, compared to the motion of the waves of the ſea. Our author alſo obſerves, that when the tide runs over ſhoals, and flows upon flat ſhores, the water is raiſed to a greater height than in the open and deep oceans that have ſteep banks; becauſe the force of its motion cannot be broke, upon theſe level ſhores, till the water riſes to a greater height.

If a place communicates with two oceans (or two different ways with the ſame ocean, one of which is a readier and eaſier paſſage) two tides may arrive at that place in different times, which, interfering with each other, may produce a great variety of phænomena. An extraordinary inſtance of this kind is mentioned by our author at Bathſha, a port in the kingdom of Tunquin in the Eaſt-Indies, of northern latitude 20° 50′. The day in which the moon paſſes the equator, the water ſtagnates there without any motion: as the moon removes from the equator, the water begins to riſe and fall once a day; and it is high water at the ſetting of the moon, and low water at her riſing. This daily tide increaſes for about ſeven or eight days, and then decreaſes for as many days by the ſame degrees, till this motion ceaſes when the moon has returned to the equator. When ſhe has paſſed the equator, and declines towards the ſouth pole, the water riſes and falls again, as before; but it is high water now at the riſing, and low water at the ſetting, of the moon.

This theory of tides has been extended ſo far, as to eſtimate the tides, or elevations of the waters of the moon, produced by the attraction of the earth: thus, let us ſuppoſe the quantity of matter (Q) in the earth to be to that in the moon (q) as 40 to 1, that is, $Q : q :: 40 : 1$; and let us firſt ſuppoſe the earth and moon of equal bulk, and repreſented by A I K (*ibid.* fig. 6.) and B D E, and the force (F) of the earth, at the ſurface of the moon B, will be to the force (f) of the moon at the ſurface of the earth A, directly as the maſſes of matter in each (becauſe of the equal diſtances T B and L A) that is, $F : f :: Q : q :: 40 : 1$. Again, let L B

be to LC as the diameter of the earth to that of the moon, which is as 365 to 100, then will the force at B be to the force at C as LB to LC, which let be as F to f, then $F : f :: 365 : 100$, whence $F = \frac{365f}{100}$; and above we have $F = 40f$, therefore $4000f = 365f$; and ſo $f : f :: 365 : 4000 :: 1 : 11$ nearly; that is, the power of the earth to raiſe the water at the moon C, is to that of the moon at the earth A as 11 to 1, very nearly.

If the moon can raiſe the water here 10 feet, the earth can raiſe the water there to the height of 110 feet; but becauſe the moon always turns about her axis in the ſame time as ſhe revolves about the earth, the waters (if any there be) will be raiſed on this and the oppoſite ſide, and always continue over the ſame part of the moon's ſurface, ſo that there can be no different heights of water there, and conſequently no tides, except what ſmall ones may happen on account of the ſun's attraction, and her various inequalities of motion, and diſtance from the earth.

The air, which is 860 times lighter than water, muſt yield in proportion more eaſily to the attracting force of the ſun and moon; and therefore the tides will in this profound and vaſt aërial ocean be very conſiderable and importing: but of this the reader may expect a further account under the articles ATMOSPHERE, HEAT, WIND, *&c.*

TIDE-WAITERS, or TIDESMEN, are inferior officers belonging to the cuſtom-houſe, whoſe employment it is to watch or attend upon ſhips, until the cuſtoms be paid: they get this name, from their going on board ſhips, on their arrival in the mouth of the Thames or other port, and ſo come up with the tide.

TIDOR, one of the Molucca iſlands, ſituated in 125° eaſt long. and 1° north lat.

TIERACHE, the moſt eaſterly diviſion of Picardy, in France.

TIERCE, or TEIRCE, a meaſure of liquid things, as wine, oil, *&c.* containing the third part of a pipe, or forty-two gallons. See the article MEASURE.

TIERCE, in gaming, a ſequence of three cards of the ſame colour. See the articles PICQUET and QUADRILLE.

TIERCED, *tiercé*, in heraldry, denotes the ſhield to be divided by any of the partition-lines, as party, coupy, tranchy, or tailly, into three equal parts of different colours or metals.

TIGE, in architecture, a french term for the ſhaft or ſuſt of a column, comprehended between the aſtragal and the capital. See COLUMN and SHAFT.

TIGER, or TYGER, *tigris*, in zoology, an animal belonging to the felis-kind, with an enlongated tail, and virgated ſpots. See the article FELIS.

The tiger is a large and terrible animal, exceeding the lion both in ſize and fierceneſs; being at its full growth of the bigneſs of a ſmall heifer: its head is large, and the teeth enormouſly long: the fore-legs are very thick and ſtrong, and the tail is long: the ground colour in the tiger is a pale tawney, with an admixture of brown; but it is all over variegated with ſtreaks of black. See plate CCLXXVII. fig. 3.

The tiger has its name from its ſuppoſed ſwiftneſs, and has been deſcribed by almoſt all authors as one of the ſwifteſt of all the wild carnivorous animals; but this has been wholly contradicted by ſuch authors as have ſeen the creature, who all declare that it is a ſlow and ſluggiſh animal, and is unable to overtake a man, or almoſt any animal that has an opportunity of running away from it. It will give two or three large leaps; but if it do not ſeize its prey in theſe, is but ill qualified to catch it afterwards.

TIGER-SHELL, a beautiful ſpecies of voluta, of a duſky red colour, ſpotted all over with large irregular blotches of white: it is brought from the Eaſt-Indies, and is about two inches and an half in length, and about an inch in diameter. See plate CCLXXXV. fig. 1.

TIGRIS, a large river of Turky in Aſia, which, riſing in the mountains of Armenia, runs ſouthward, dividing Diarbeck or Meſopotamia, from Curdeſtan or the antient Aſſyria; and having paſſed by Bagdat, joins the Euphrates in Eyraca Arabic, or the antient Chaldea. See the article EUPHRATES.

TILBURY, a fortreſs in the county of Eſſex, ſituated on the river Thames, oppoſite to Graveſend, twenty miles eaſt of London.

TILE, or TYLE, among builders. See the article TYLE.

TILIA, the LIME-TREE, in botany, a genus of the *polyandria-monogynia* claſs of plants, the corolla of which conſiſts of five oblong and obtuſe petals, crenated at the points: the fruit is a coriaceous, globoſe, quinquelocular capſule, containing a ſingle roundiſh ſeed in each. However,

ever, one ſeed only of the five uſually ripens, and the very cells of the others often diſappear, ſo that the fruit ſeems unilocular. See plate CCLXXVII. fig. 4.

The flowers of the lime-tree are eſteemed antepileptic, and a ſpecific in all kinds of ſpaſms and pains: they are uſed in infuſion, like tea.

The timber of the lime-tree is uſed by the carvers, as being a ſoft light wood; alſo by architects, for framing the models of their buildings: the turners likewiſe uſe it for making light bowls, diſhes, &c. but it is too ſoft for any ſtrong purpoſes.

TILLÆA, in botany, a genus of the *triandria trigynia* claſs of plants, the flower of which conſiſts of three ovated, acute, and plane petals; and its fruit of three acuminated and reflex capſules, containing each two oval ſeeds.

TILLANDSIA, in botany, a genus of the *hexandria monogynia* claſs of plants, with a tubulated monopetalous flower, trifid at the limb: the fruit is a long, obtuſely trigonal, and acuminated capſule, formed of three valves, and containing only one cell, with numerous ſeeds affixed to a long capillary plume.

TILLER, in huſbandry, denotes a young tree, left to grow till it be fellable for timber.

TILLER *of a ſhip*, a ſtrong piece of wood faſtened in the head of the rudder, and in ſmall ſhips and boats called the helm. See the article HELM.

In ſhips of war, and other large veſſels, the tiller is faſtened to the rudder in the gun room; and to the other end there are ropes faſtened, which paſs upwards to the quarter-deck, where the ſhip is ſteered by means of a wheel. See the article STEERING.

TILLAGE, in huſbandry, is the opening, breaking, and dividing the ground by the ſpade, the plough, the hoe, or other like inſtruments. See the articles PLOWING, HOEING, &c.

The finer any land is made by tillage, the richer it will become, and the more plants it will maintain; and it has been frequently obſerved, that in a large field, where at ſome time one part of the ground has been better tilled than the reſt, that part of the ground has produced the beſt crops, and been eaſily diſtinguiſhed by it from the reſt of the field, even ſix or ſeven crops after the time of the particular good tillage. A piece of ground being once made finer than the reſt, will a long time ſhew the advantage of it; becauſe the dews have more power to enrich it, they penetrating farther than the ſuperficies, whereby the roots are able to enter. The fine parts of the earth are impregnated throughout their whole ſubſtance with ſome of the riches carried in by the dews, and there repoſited until, by tillage, the inſide of theſe fine parts become ſuperficies; and as the corn drains them, they are again ſupplied as before; but the rough large parts cannot have that benefit, and the dews not penetrating but to their ſurface, they remain poor. The experiments mentioned by Mr. Evelyn prove this beyond conteſt. Take of the moſt barren earth you can find, powder it well, and expoſe it abroad for a year, inceſſantly agitating it; and after this, without any other management, this earth will be the moſt fertile that can be conceived, and will readily receive any plant from the fartheſt Indies: all vegetables will proſper and flouriſh in this once barren earth, and bear their fruit as kindly with us, under a due degree of artificial heat, as in their native climates.

The artificial duſt will entertain plants which refuſe dung and other violent applications, and has a more nutritive power than any artificial dung or compoſt whatſoever: and by this pulveriſing and expoſing, the very nature of a ſoil may be changed, and the tougheſt clay made as light and friable as common light earth, and as fit for the nouriſhment of the tendereſt plants as any other; though, in its natural condition, its pores were too ſmall to give way to their tender roots, and had no communication one with another.

This is a ſort of improvement of land that cannot be practiſed in the large way, in fields, &c. but as it only conſiſts in dividing and breaking the particles of earth, and expoſing them thus broken to the air, it is plain that common tillage approaches more or leſs to it, as more or leſs labour is employed; and the experiment proves, that the farmer need never fear beſtowing too much tillage on any ſort of ground.

TILT-BOAT, a boat covered with a tilt; that is, a cloth or tarpawling, ſuſtained by hoops, for the ſheltering of paſſengers.

TIMAR, a tract or portion of land, which the grand ſeignior grants to a perſon on condition of ſerving him in war on horſe-

back. Hence, thoſe who enjoy ſuch lands, are called timariots; who beſides the above-mentioned ſervice, pay an acknowledgement of one tenth of their revenue.

TIMBER, includes all kinds of felled and ſeaſoned woods. See WOOD.

Of all the different kinds known in Europe, oak is the beſt for building, and even when it lies expoſed to air and water, there is none equal to it. Fir-timber is the next in degree of goodneſs for building, eſpecially in this country, where they build upon leaſes. It differs from oak in this, that it requires not much ſeaſoning, and therefore no great ſtock is required before-hand. Fir is uſed for flooring, wainſcoting, and the ornamental parts of building within doors. Elm is the next in uſe, eſpecially in England and France; it is very tough and pliable, and therefore eaſily worked; it does not readily ſplit; and it bears driving of bolts and nails better than any other wood; for which reaſon it is chiefly uſed by wheel-wrights, and coach-makers for ſhafts, naves, &c. Beech is alſo uſed for many purpoſes; it is very tough and white when young, and of great ſtrength, but liable to warp very much when expoſed to the weather, and to be worm-eaten when uſed within doors; its greateſt uſe is for planks, bedſteads, chairs, and other houſhold goods. Aſh is likewiſe a very uſeful wood, but very ſcarce in moſt parts of Europe; it ſerves in buildings, or for any other uſe, when ſcreened from the weather; handſpikes, and oars are chiefly made of it. Wild cheſnut-timber is by many eſteemed to be as good as oak, and ſeems to have been much uſed in old buildings; but whether theſe trees are more ſcarce at preſent than formerly, or have been found not to anſwer ſo well as was imagined, it is certain this timber is now but little uſed. Walnut-tree is excellent for the joyner's uſe, it being of a more curious brown colour than beech, and not ſo ſubject to the worms. The poplar, abel, and aſpen trees, which are very little different from each other, are much uſed inſtead of fir, they look well, and are tougher and harder. See OAK, FIR, ASH, &c.

The goodneſs of timber not only depends on the ſoil and ſituation in which it ſtands, but likewiſe on the ſeaſon wherein it is felled. In this, people diſagree very much; ſome are for having it felled as ſoon as its fruit is ripe, others in the ſpring, and many in the autumn. But as the ſap and moiſture of timber is certainly the cauſe that it periſhes much ſooner than it otherwiſe would do, it ſeems evident that timber ſhould be felled when there is the leaſt ſap in it, *viz.* from the time that the leaves begin to fall, till the trees begin to bud. This work uſually commences about the end of April in England, becauſe the bark then riſes moſt freely; for where a quantity of timber is to be felled, the ſtatute requires it to be done then, for the advantage of tanning; ſee TANNING.

The antients chiefly regarded the age of the moon in felling their timber; their rule was to fell it in the wain, or four days after the new moon, or ſometimes in the laſt quarter. Pliny adviſes it to be in the very article of the change, which happening to be in the laſt day of the winter ſolſtice, the timber, ſays he, will be incorruptible. Timber ſhould likewiſe be cut when of a proper age; for when it is either too young, or too old, it will not be ſo durable, as when cut at a proper age. It is ſaid, that oak ſhould not be cut under ſixty years old, nor above two huudred. Timber however, ſhould be cut in their prime, when almoſt fully grown, and before they begin to decay; and this will be ſooner or later, according to the dryneſs or moiſtneſs of the ſoil, where the timber grows; as alſo according to the bigneſs of the trees; for there is no fixt rules in felling of timber, experience and judgment muſt direct here as in moſt other caſes.

After timber has been felled and ſawed, it muſt be ſeaſoned: for which purpoſe ſome adviſe it to be laid up in a very dry airy place, yet out of the wind and ſun, or at leaſt free from the extremities of either; and that it may not decay, but dry evenly, they recommend it to be daubed over with cow-dung. It muſt not ſtand upright, but lie all along, one piece over another, only kept apart by ſhort blocks interpoſed, to prevent a certain mouldineſs, which they are otherwiſe apt to contract in ſweating on one another; from which ariſes frequently a kind of fungus, eſpecially if there be any ſappy parts remaining. Others adviſe, the planks of timber to be laid for a few days in ſome pool or running ſtream, in order to extract the ſap, and afterwards to dry them in the ſun or air. By this means, it is ſaid, they will be prevented, from either chopping, caſting,

Fig. 1. Strength of TIMBER.

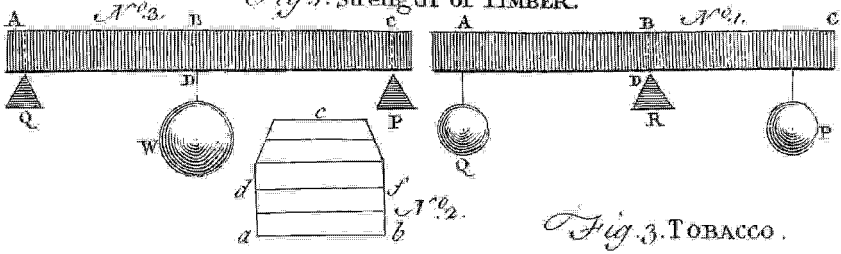


Fig. 2. TOAD.

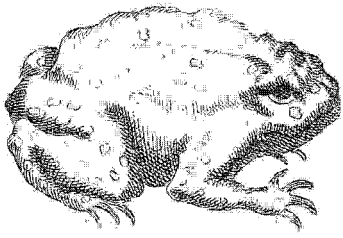


Fig. 3. TOBACCO.

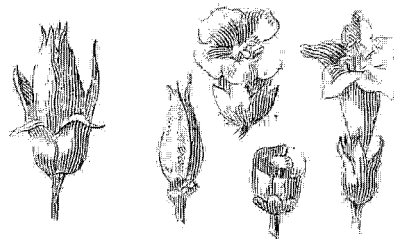


Fig. 4. TORPEDO

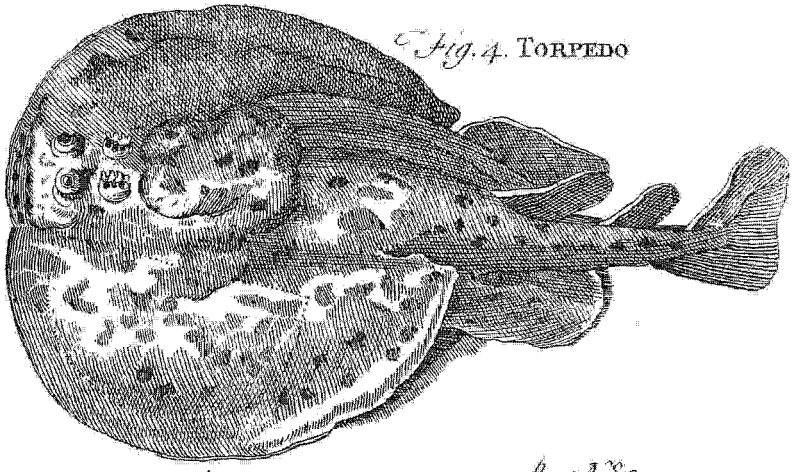
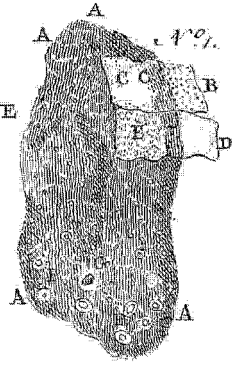
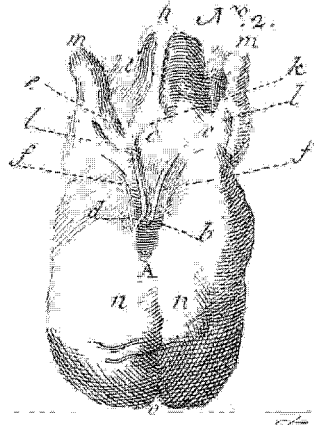


Fig. 5. the TONGUE





T. Jefferys sculp.

or cleaving, but againſt ſhrinking there is no remedy. Some again, are for burying them in the earth, others in a heat; and ſome for ſcorching and ſeaſoning them in fire, eſpecially piles, poſts, &c. which are to ſtand in water or earth. The Venetians firſt found out the method of ſeaſoning by fire; which is done after this manner; they put the piece to be ſeaſoned into a ſtrong and violent flame, in this they continually turn it round by means of an engine, and take it out when it is every where covered with a black coaly cruſt; the internal part of the wood is thereby ſo hardened, that neither earth nor water can damage it for a long time afterwards.

After the planks of timber have been well ſeaſoned and fixed in their places, care is to be taken to defend or preſerve them; to which the ſmearing them with linſeed oil, tar, or the like oleaginous matter, contributes much. The antients, particularly Heſiod and Virgil, adviſe the ſmoak-drying of all inſtruments made of wood, by hanging them up in the chimneys where wood fires are uſed. The Dutch preſerve their gates, portcullices, drawbridges, ſluices, &c. by coating them over with a mixture of pitch and tar, whereon they ſtrew ſmall pieces of cockle and other ſhells, beaten almoſt to powder, and mixed with ſea-ſand, which incruſts and arms them wonderfully againſt all aſſaults of wind and weather. When timber is felled before the ſap is perfectly at reſt, it is very ſubject to the worms; but to prevent and cure this, Mr. Evelyn recommends the following remedy, as the moſt approved. Put common ſulphur into a cucurbit, with as much aqua fortis as will cover it three fingers deep; diſtill it to a dryneſs, which is performed by two or three rectifications. Lay the ſulphur that remains at bottom, being of a blackiſh, or ſad red colour, on a marble, or put it in a glaſs, and it will diſſolve into an oil; with this oil anoint the timber which is infected with worms. This, he ſays, will not only prevent worms, but preſerves all kinds of woods, and many other things, as ropes, nets, and maſts, from putrefaction, either in water, air, or ſnow.

To meaſure round timber, let the mean circumference be found in feet and decimals of a foot; ſquare it, multiply this ſquare by the decimal 0.079577, and the product by the length. Ex. Let the mean circumference of a tree be 10.3 feet, and the length 24 feet. Then $10.3 \times 10.3 \times 0.079577 \times 24 = 202.615$, the number of cubical feet in the tree. The foundation of this rule is, that when the circumference of a circle is 1, the area is 0.07957747215, and that the areas of circles are as the ſquares of their circumferences.

But the common way uſed by artificers for meaſuring round timber, differs much from this rule. They call one fourth part of the circumference the girt, which is by them reckoned the ſide of a ſquare, whoſe area is equal to the area of the ſection of the tree; therefore they ſquare the girt, and then multiply by the length of the tree. According to their method, the tree of the laſt example would be computed at 159.13 cubical feet only.

For the method of meaſuring round timber by the ſliding rule, ſee RULE.

For meaſuring hewn or ſquare timber, the cuſtom is, to find the middle of the length of the tree, and there to meaſure its breadth, by clapping two rules to the ſides of the tree, and meaſuring the diſtance betwixt them; in like manner they meaſure the breadth the other way. If the two be found unequal, they are added together, and half their ſum is taken for the true ſide of the ſquare.

As to the ſtrength of timber, Mr. Parent is the firſt who has treated this ſubject in a ſcientific manner, and in order to enforce his demonſtrations, he made ſeveral experiments, with various ſcantlings of oak and fir. Mr. Muller, in his treatiſe on fortification, gives the following problem, to determine the ſtrength of a ſcantling, whoſe dimenſions are given. He ſuppoſes that all the fibres of the wood are ſtraight, and of the ſame ſtrength, even in its weakeſt part, and that the fibres are the ſame in the ſame ſort of wood; and although this may not be ſtrictly true, yet it is ſufficiently near enough in practice, ſo as to cauſe no ſenſible error. Suppoſe the ſcantling A B C (plate CCLXXIX. fig. 1. n° 1.) to be ſupported in the middle D, by the edge of a triangular block R, and two equal bodies, P, Q, to be ſuſpended at A and C, equally diſtant from the middle B, of ſuch a weight as to break the ſcantling. It is evident, that the weights P and Q will cauſe the ſcantling to bend at firſt, ſo as to make a kind of curvilinear angle at B, and then to break in that place, in a ſection B D, perpendicular to either of the

the ſides A C; now as the power or force of theſe weights is more or leſs, according as they are ſuſpended farther from, or nearer to the fixed point D; theſe forces will therefore be in proportion to the products of the weights of each multiplied by its reſpective diſtance from the ſection B D; or becauſe the weights and diſtances are here ſuppoſed equal, twice the product of one of the weights P, multiplied by its diſtance, from the ſection B D, and will expreſs the force of theſe two weights. The force of the weights being thus determined, the reſiſtance or ſtrength of the wood is next to be found, which is done in the following manner. Let *a c b* (*ib.* n° 2.) repreſent the ſection of the ſcantling; it is evident that this area repreſents the ſum of all the fibres to be torn or broken; and as they are all ſuppoſed equal, and of the ſame ſtrength, this area will expreſs the ſum of the ſtrength of all the fibres: but as the point D, or the baſe *a b* of the ſection is fixed; and the directions of the fibres perpendicular to the area *a c b*: the force or reſiſtance of each fibre is equal to the product of its ſtrength, multiplied by its diſtance from the baſe *a b*; and therefore the ſum of all the fibres placed in the ſame line *d f*, parallel to the baſe *a b*, multiplied by their diſtance *a d*, from that baſe *a b*, will expreſs their momentum or reſiſtance. What has been proved in regard to all the fibres placed in the line *d f*, is equally true of all thoſe placed in any other line parallel to the baſe *a b*: and therefore the ſum of all theſe products will expreſs the total ſtrength or reſiſtance of the wood: but by the nature of the center of gravity, the product of the area *a c b*, multiplied by the diſtance of its center of gravity from the baſe *a b*, will expreſs the total ſtrength or reſiſtance of all the fibres, or that of the whole ſcantling; conſequently, having the ſtrength of any ſcantling of the ſame wood determined by experiment, that of any other may be found.

If the ſcantling A C (*ibid.* n° 3.) be ſupported at both ends by the triangular blocks P, Q, and the weight W, hanging in the middle B: then if we ſuppoſe the weight P and Q in the firſt figure, to repreſent the blocks P and Q in this; then as each block ſupports half the weight W; it is evident, that the weight W, multiplied by the diſtance A B or B C, will expreſs its momentum or force. Moreover, ſince the weight W is ſuſpended in the middle betwixt the fixed points, it is evident that each block ſupports exactly half the weight; and as the power or force of this weight on the blocks P, Q, is as the product of half the weight multiplied by the diſtance A B or B C of its direction from the fixed point, it follows, that the whole force of this weight is as twice the product of half the weight W, multiplied by A B or B C; or as the whole weight W multiplied by the diſtance A B or B C.

Hence alſo, if the length A C of the ſcantling between the fixed points A, C, be c; the area of the ſection s; the diſtance of its center of gravity from the baſe d, and the weight W, w; then will $\frac{1}{2} c w$ expreſs the force of the weight W, and $d s$ the ſtrength of the ſcantling: therefore the momentum of the weight is to the momentum of the ſcantling as $\frac{1}{2} c w$ is to $d s$; or as w is to $\frac{2 d s}{c}$, and if this ratio be given $w = \frac{2 d s}{c}$.

From whence may be drawn ſeveral uſeful conſequences. 1. The ſtrengths of two ſcantlings of the ſame wood, and of different dimenſions; or, which is the ſame, the weights they will bear, are to each other as the products of their ſections multiplied by the diſtances of the centers of gravity from the baſe, divided by their lengths. 2. The ſtrengths of two ſcantlings of the ſame wood, which have the ſame length, are as the products of their ſections multiplied by the diſtances of their centers of gravity from the baſe. 3. The ſtrengths of two ſcantlings of the ſame wood, which have equal ſections, are as the diſtances of their centers of gravity divided by their lengths. 4. The ſtrength of ſcantlings of the ſame wood, whoſe diſtances of their centers of gravity of their ſections, from the baſe, are equal, will be to each other as their ſections divided by their lengths.

Again, if the ſection of the ſcantling A C be a rectangle placed flat on one of its ſides, which we call b, and its height or other ſide a; then will $a b$ expreſs the area of the ſection; and the diſtance d of its center of gravity from the upper baſe, will be $\frac{1}{2} a$, therefore the equation already found $w = \frac{2 d s}{c}$ becomes here $w = \frac{a a b}{c}$ which ſhews that the ſtrength of a rectangular ſcantling

ling laying flat on one of its ſides, is as the product of the ſquare of its height multiplied by its baſe, and divided by its length. Hence, a deal board of an inch thick, and ten inches broad, being placed on its flat ſide, and then on its narrow ſide; the force in the firſt caſe will be to the force in the ſecond, as 1 is to 10. For the force in the firſt caſe, will be as 10 multiplied by the ſquare of unity; and in the ſecond, as unity multiplied by the ſquare of 10, that is, as 10 is to 100, or as unity is to 10. So that if it bears 50 pounds when it lies flat, it will bear 500 when it lies on the narrow ſide.

TIMBRE, or TIMMER, in heraldry, denotes the creſt of an armory, or whatever is placed at top of the eſcutcheon, to diſtinguiſh the degree of nobility, either eccleſiaſtical or ſecular.

TIME, *tempus*, a ſucceſſion of phænomena in the univerſe; or a mode of duration, marked by certain periods or meaſures, chiefly by the motion and revolution of the ſun.

The idea of time, in the general, Mr. Locke obſerves, we acquire by conſidering any part of infinite duration as ſet out by periodical meaſures: the idea of any particular time, or length of duration, as a day, an hour, *&c.* we acquire firſt, by obſerving certain appearances at regular, and, ſeemingly, at equidiſtant periods.

Now, by being able to repeat thoſe lengths or meaſures of time, as often as we will, we can imagine duration, where nothing really endures or exiſts; and thus we imagine to-morrow, next year, *&c.*

Some of the latter ſchool-philoſophers define time to be the duration of a thing, whoſe exiſtence is neither without beginning nor end: by which time is diſtinguiſhed from eternity.

Time is diſtinguiſhed into abſolute and relative. Abſolute time, is time conſidered in itſelf, and without any relation to bodies, or their motions. This flows equally, *i. e.* never proceeds faſter or ſlower, but glides on in a conſtant, equable tenor. Relative time, is the ſenſible meaſure of any duration by means of motion. For ſince that equable flux of time does not affect our ſenſes, nor is any way immediately cognizable thereby, there is a neceſſity for calling in the help of ſome nearly equable motion to a ſenſible meaſure, whereby we may determine its quantity, by the correſpondency of the parts of this with thoſe of that.

Hence, as we judge thoſe times to be equal which paſs, while a moving body, proceeding with an equable velocity, paſſes over equal ſpaces; ſo we judge thoſe times to be equal which flow while the ſun, moon, and other luminaries, perform their revolutions, which, to our ſenſes, are equal.

But ſince the flux of time cannot be accelerated, nor retarded, whereas all bodies move ſometimes faſter and ſometimes ſlower, and there is, perhaps, no perfectly equable motion in all nature, it appears hence to follow, that abſolute time ſhould be ſomething truly and really diſtinct from motion. For let us ſuppoſe the heavens and ſtars to have remained without motion from the very creation, does it hence follow, that the courſe of time would have been at a ſtand? Or, rather, would not the duration of that quieſcent ſtate have been equal to the very time now elapſed?

Aſtronomical TIME, is that taken purely from the motion of the heavenly bodies without any other regard.

Civil TIME, is the former time accommodated to civil uſes, and formed and diſtinguiſhed into years, months, days, *&c.*

TIME, in muſic, is an affection of ſound, whereby we denominate it long or ſhort, with regard to its continuance in the ſame degree of time. See SOUND.

Common, or duple time, is of two ſpecies. 1. When every bar or meaſure is equal to a ſemi-breve, or its value, in any combination of notes of a leſſer quantity. 2. When every bar is equal to a minim, or its value, in leſſer notes. The movements of this kind of meaſure are various, but there are three common diſtinctions; the firſt ſlow, ſignified by the mark C; the ſecond briſk, ſignified by ; the third very quick, ſignified by .

For triple time, ſee TRIPLE.

TIME, in fencing. There are three kinds of time; that of the ſword, that of the foot, and that of the whole body. All the times that are perceived out of their meaſure, are only to be conſidered as appeals, or feints, to deceive and amuſe the enemy. See FENCING.

TIMOR, an iſland in the Indian-ocean, ſituated between 122° and 126° of eaſt long.

long. and between 8° and 10° ſouth lat. It is in the poſſeſſion of the Dutch, and ſaid to have gold mines.

TIN, *ſtannum*, ♃, a well-known whitiſh metal, ſofter than ſilver, yet much harder than lead. See the article METAL.

Tin is the lighteſt of all the metals: it is remarkable for a quality that no other of them has, which is, that when bent it makes a crackling noiſe. It is harder than lead, but leſs ſo than any other of the metals: it is malleable in a very remarkable degree, though leſs ſo than lead: it may be eaſily drawn into a coarſe wire, but if this be attempted to be brought to any degree of fineneſs, it ſnaps and breaks under the workman's hands.

Tin is leſs ſuſceptible of ruſt than moſt of the other metals: it is very little elaſtic, and ſcarce at all ſonorous. It melts with a much ſmaller degree of fire than any other metal, a heat but a little greater than boiling-water being ſufficient to fuſe it. It melts before it grows red-hot, like lead: and a degree of heat ſo much leſs even than that requiſite to the running of lead, is neceſſary to the fuſing of this metal, that it may be eaſily ſeparated from the other by eliquation; and if the fire be kept under a mixed maſs of the two, ſo low as to be juſt hot enough to melt the lead, the tin will all run off from it.

Tin amalgamates very readily with mercury, and may be mixed in fuſion with moſt other metals, and as readily ſeparated from them again by the before-mentioned proceſs of eliquation. It is the leaſt ſimple of all the metals, being brought, by a very ſmall degree of fire, to emit ſulphureous fumes: theſe are plainly the abſolute ſulphur of the metal. They do great injury to the people employed to work upon it, rendering them pale, and often abſolutely deſtroy them. The conſequence of the emitting theſe fumes ſo abundantly is, that tin, of all metals, loſes moſt of its weight, and calcines moſt eaſily in the fire. Expoſed to the focus of a great burning-glaſs, it immediately melts, and ſends off a large quantity of thick, white fume; the remaining matter is then a fine cryſtalline or gloſſy matter, in form of needles; theſe, if held ever ſo long in the ſame heat, undergo no farther change, never running into a maſs of glaſs, as the remains of moſt of the metals do under the ſame circumſtances; but, like the glaſſes of the other metals, if expoſed again to the ſame heat, laid on a piece of charcoal, they immediately run into tin again; and the ſame thing happens if it be continued on the tile or coppel it was firſt placed on in the focus, and ſome fat matter, as tallow, or the like, to be added to it. Filings of tin, thrown into the flame of a candle, take fire, and render the flame blue, emitting a viſible fume, and a ſmell of garlic: melted in a crucible, with a mixture of nitre, it deflagrates. Its conſtituent matters, therefore, ſeem to be a cryſtalline earth which melts with great difficulty, and an inflammable ſulphur; in which, from its ſmell, while calcining, and from its poiſonous quality, it is probable there may be ſomething of arſenic mixed.

For the ſpecific gravity of pure tin, ſee the article GRAVITY.

Tin ſo far endures the force of lead and antimony in the refiners teſt, that it is hardly to be ſeparated from them, unleſs by the addition of copper: it adheres to the reſt of the metals with greater eaſe than any other, and hence it is in continual uſe in covering plates of iron, and lining copper, and other metals, to prevent their ruſting, and to ſave the liquids put into them from taking up any bad qualities from thoſe metals, as it is much more difficultly diſſolved by common menſtruums than either of them.

Tin, in many things, greatly approaches to the nature of ſilver. It very readily melts with ſilver, gold, or copper; when the mixture is made with equal, or even a leſs quantity, it renders them extremely brittle: but it is very ſingular, that if it be mixed in a much larger quantity, they ſtill continue pliant and flexile. Ten parts of tin, and one of copper, make a maſs more rigid indeed than tin, yet malleable and ductile. Silver, of all the metals, ſuffers moſt by an admixture of tin, a very ſmall quantity of it ſerving to make that metal as brittle as glaſs; and what is worſe, being very difficultly ſeparated from it again. The addition of about one tenth part of copper to tin makes it fit for the common uſes of life, in veſſels of various kinds, as it becomes, by the mixture, more durable; a little zink, added to this mixture, gives the metal a yellow colour; and, as it is mixed in greater or leſs quantity, makes it fit for caſting of cannon and for bells.

Iron readily mixes with tin, in fuſion, if the fire be briſk, and the iron be heated white hot before the tin be added. Twice the quantity of this metal, added to iron ſo heated, readily runs with it into an odd ſubſtance, which is very white and brittle, and readily anſwers to the magnet. This has been uſed, by ſome, as a pretence of its not being iron, and that that the loadſtone would attract another metal beſide that: but the fallacy is eaſily diſcovered by any one that underſtands any thing of metallurgic analyſis.

Lead bears a conſiderable admixture of tin, without being affected as gold and ſilver are, which are both rendered brittle by it; at leaſt, its effects on this metal are in a much ſmaller degree. The very vapour of tin has the ſame effect with the metal itſelf on ſilver, gold, and copper, rendering them brittle. Many a metallurgiſt has been long plagued by theſe vapours by a piece of tin being accidentally among his charcoal; the conſequence of which has been, that, till it was burned wholly away, theſe metals have been rendered as brittle as glaſs under the hammer, by only being fuſed over theſe coals. It is owing to this property of tin, in making the metals it is mixed with brittle, that it renders them ſonorous. Mr. Boyle has expreſſed a wonder that tin, which is itſelf not much ſonorous, ſhould on mixture with copper render it more ſo; but if we conſider that the ſame ſort of diſpoſition of parts which renders metals rigid and brittle renders them ſonorous, the myſtery is explained.

The proper ſolvent of tin, in its true malleable ſtate, is aqua regia. It will not well diſſolve in any of the other menſtrua of the ſtronger kinds, nor indeed very readily in this. We are not, however, to wonder at this difficulty of ſolution in tin, ſince we find it contains much more ſulphur than any other metal, and ſulphur is not one of thoſe ſubſtances that are to be diſſolved by acids. That this is a fact we find by putting calcined tin, inſtead of common malleable tin, into the menſtruum, for in this caſe even vinegar will diſſolve it. While tin is in its malleable ſtate, the weakeſt acids diſſolve it beſt. Verjuice, and it is ſaid even ſour apples boiled in tin veſſels, acquire a taſte of that metal, though the ſtrongeſt acids, aqua regia excepted, boiled in the ſame veſſels, acquire no flavour from it at all.

Many of the chemical writers have been of opinion, that, if the ſulphur could be thoroughly purged from tin, it would be no longer tin, but ſilver; it is certain that the two metals have many things in common. If diſſolved in aqua regia, tin is bitter, as well as ſilver, in ſolution with the nitrous acid; but the cryſtals which are produced from a ſolution of it in vinegar, after it has been calcined for forty-eight hours together, which is a neceſſary ſtep towards ſuch a ſolution, (and which one would think ſhould bring it nearer to ſilver than before, if the diſſipating its ſulphur were the way to do it,) differ wholly from thoſe of ſilver. We have indeed accounts, in many authors, of tin being made to yield a large quantity of ſilver by peculiar proceſſes; but that careful experimenter, Mr. Boyle, tells us, that all tin is not to be expected to yield thoſe advantages in the ſame manner, for that himſelf had ſeparated pure cryſtals of ſilver from one parcel of tin by a peculiar menſtruum, but that another parcel of the ſame metal would not anſwer in the ſame manner.

Though tin and lead readily unite in fuſion over a gentle fire, if the heat be afterwards raiſed to a violent degree, there is a viſible motion excited in the mixture; and the conſequence is, that both are reduced to a calx, and the lead becomes extremely difficult afterwards to vitrify.

The effect that zink has upon a mixture of tin and copper, the copper being in a larger proportion than has been uſually given in ſuch mixtures, is little known, and ſeems to be a ſecret that the people who are poſſeſſed of it intend to make uſe of to themſelves.

Tin, when it mixes itſelf with cryſtal in the earth, influences both its figure and colour. It gives it a pyramidal form conſiſting of four ſides, ſhort and with a broad baſe, and at the ſame time uſually communicates a yellow colour with an admixture of a duſky brown, which makes it much inferior to the yellow cryſtal made ſo by lead. Even the tin-grains, though very different ſubſtances from the cryſtals we are deſcribing, have ſomething of this yellow colour which appears when they are broke into ſmall pieces, though in the maſs they are opake and blackiſh. In the making of the artificial gems, there is a method of obtaining this colour from tin, and communicating it to glaſſes. It ſeldom ſuc-

ceeds indeed in the common way of doing this by lead: but in vitrifications, where the baſis is borax, the calx of tin properly treated with vinegar yields cryſtals, which will communicate the true colour of the browner topazes to the vitrified maſs.

The ores of tin are very various, as it is found blended with all kinds of ſubſtances, with marcaſitic and ſtony matter, and even with other metals. The Germans have lately talked of finding native tin in the perpendicular fiſſures of ſome of their iron mines; but there ſeems no foundation for the opinion; for this pretended native tin wants the firſt of all the characters of a native metal, malleability. It flies to pieces under the hammer, and on trial in the fire proves to be a marcaſitic ore, very rich indeed in tin, a very ſingular and valuable ſubſtance, but not, as pretended, native tin. This remarkable ore is found in nodules from an ounce to three or four in weight; it is of a bright ſilvery colour, like the white arſenical pyrites, but covered with a coarſe duſky cruſt: when properly worked, it is the richeſt tin-ore to be met with, five drachms of pure tin having been ſeparated from an ounce of it.

The next ore to this in richneſs, and that which has conſequently been uſually accounted the richeſt of all, is the tin-grain, or lapis jovius. This is an ore of tin, of a fine gloſſy black colour on the outſide, but, in thin pieces held up againſt the light, it is tranſparent and yellowiſh: it is the heavieſt of all the metalline ores, and is of a very irregular figure, but in the fineſt pieces it ſeems to approach to the ſhape of thoſe cryſtals which are found joined baſe to baſe, without any intermediate column. In ſize it is of the bigneſs of a large walnut down to that of a pin's head; for of that minuteneſs we meet with ſome perfect tin-grains.

After the tin-grain we ſhall mention a black and very heavy tin-ore, of an irregular figure and metalline appearance; but this, though it promiſes very fairly by its weight, ſeldom yields ſo much as half a drachm of metal from the ounce, in its crude ſtate; if waſhed indeed, and all the foreign matter carried off, it may be reduced almoſt to the purity of the tin-grains before the working.

The tin-ores of Germany uſually contain a very large quantity of iron; ours are free from this admixture, and are greatly the more valued for it. Our other ores of tin, beſides the two above deſcribed, are a browniſh or blackiſh ſtony one, very hard and heavy; this is debaſed by a great quantity of the ſtony matter, and requires careful waſhing before it is brought to the fire; and a yellowiſh or whitiſh ore; which are leſs heavy and more brittle than the others, and contain a large quantity of common ſulphur; and to theſe may be added another, in which the metal is yet more mixed with ſulphur: this is the mundic found in the tin-mines, which is very bright and ſhining, of a ſilver or gold colour, and often contains a large portion of tin, though it is not ſeparated from it without difficulty, becauſe of the abundance of ſulphur in the maſs. We have alſo a red ore of tin, of a ſtony, and ſometimes of an earthy nature, and carrying ſo little of the appearance of an ore of this metal, that it is hard to gueſs what could lead any body to work it in expectation of it. It is however very rich.

Tin-ore is alſo ſometimes found mixed with that of lead, and carrying the external appearance of lead only. Some of theſe ores are neglected in France, where they might turn to a very conſiderable account under proper management. The German ores of tin are uſually ſo much like iron, that, at firſt ſight, it is ſcarce poſſible to diſtinguiſh them. We are alſo finally to add to the number of tin-ores the dodecahedral garnets ſold by our druggiſts; theſe are in general irregularly figured, but the moſt regular of them always conſiſts of twelve ſides; they are of a deep red colour, and in ſize from the bigneſs of the largeſt pea to that of a pin's head. Theſe are truly ores of tin, of the nature of the tin-grains, but not ſo rich. See GARNET, &c.

There is ſomething very ſingular in the great gravity of tin-ore beyond that of the ores of other metals; but it contains ſo much arſenic, and is ſo dangerous to the perſon who works it, that experiments are not expected to be made very frequently on it. The tin ores in general are ſtubborn and refractory in the fire; it is eaſy, however, to find whether an ore does contain this metal or not; for if a piece of it be powdered and waſhed, and afterwards ſprinkled thinly over an iron-plate made white hot on the fire, the tin-ore, in this caſe, if there be any in the maſs, will be found in little parcels of a red

red colour covered with grey flowers of an arſenical ſmell. The various kinds of mundic common in the corniſh mines are not only rejected from the works as ores themſelves, but they are carefully ſeparated from among the other ores of a better kind, as they are apt to be very troubleſome, even in the ſmalleſt quantities, in working the reſt. They then pound and waſh the ore; and when they have thus ſeparated all the lighter impurities, till there is no longer any ſmell of ſulphur or of garlic, they grind it to a tolerably fine powder, and, after waſhing it again, it is carried to the melting-houſes, where it is melted into metal by mixing it with charcoal, and urging the fire to the utmoſt violence by the blaſt of large bellows. There is a cavity at the bottom of the furnace into which the metal runs, as it ſeparates from the ore, and out of which they let it by an aperture cloſed and opened at pleaſure, running it into cakes or pigs, which are the large blocks we ſee it in.

Tin-ore, in general, contains a great quantity of arſenic, which diſcovers itſelf in the roaſting in form of a white cloud, and which it is very material to burn quite away, as it otherwiſe renders the metal brittle. Charcoal alone commonly ſerves for fluxing the ore of tin, but, if any be found very refractory, a little common black pitch is an excellent addition. See FLUX.

The virtues of tin, as a medium, given internally, have been celebrated by many of the antient writers, but it has leſs credit at preſent. We have been told that in diſeaſes of the lungs, and in diſorders of the head and uterus, there is ſcarce any thing equal to it; and that in convulſions, epilepſies, and the madneſs ariſing from the bite of a mad dog, it was a certain remedy. Theſe laſt are the only caſes in which it has any degree of credit at preſent, and that is rather among the vulgar than among phyſicians. In the manufactures it is of great uſe in ſolders, and when amalgamated with mercury, and a little biſmuth added to make it run thin, it ſerves in the ſilvering of looking-glaſſes. By calcination it makes a ſoft powder called putty, of great uſe in poliſhing glaſs and gems, and alſo in making enamels.

The preparations of tin are, 1. Powdered tin, made by pouring melted tin into a wooden box, the inſide of which is chalked all over, and briſkly ſhaking it till cold, when a part of it will be found reduced to powder, which is ſaid to be good for worms, but we have no certain account of its good effects. 2. Salt of tin, obtained by pouring diſtilled vinegar upon calcined tin, heating the ſolution till it near boils, and afterwards evaporating it to a pellicle, and ſetting it in a cool place; then there will ſhoot very pellucid and hard cryſtals, which are recommended in hyſteric caſes, to be given from two to four or five grains at a doſe. 3. The antihectic of Poterius. 4. The aurum muſivum. See the articles ANTIHECTICS and AURUM.

To theſe preparations uſed in medicine, we may add one well known as a coſmetic: it is a magiſtery of tin prepared in the manner of that of biſmuth, by firſt mixing ſix ounces of ſpirit of nitre with one ounce of ſpirit of ſea-ſalt, and then putting tin into this liquor, or aqua regia, till it is capable of holding no more: laſtly, pour the ſolution into ſix or eight quarts of ſpring-water, and the tin will be precipitated in form of a white powder, which ſhould be waſhed ſeveral times, and then dried for the uſe of the ladies in pomatums, to render the ſkin white and ſoft.

TINA, a town of european Turky, on the confines of Dalmatia, ſituated in eaſt long. 18°, north lat. 44° 6′.

TINCA, the TENCH, in ichthyology. See the article TENCH.

TINCTURE, *tinctura*, in pharmacy and chemiſtry, a ſeparation of the finer and more volatile parts of a mixed body, made by means of a proper menſtruum diſſolving and retaining the ſame. See MENSTRUUM and SOLUTION.

Rectified ſpirit of wine diſſolves the volatile oils and reſins of vegetables, whilſt water acts more immediately on their mucilaginous and ſaline matter. Hence, in whatever proportion the ſoluble parts of any vegetable are blended together, a ſpirit may be ſo adjuſted thereto by art, as entirely to diſſolve the whole, and conſequently to extract all the virtues of the ſubject, without any of the uſeleſs or woody parts. Fixed alkaline ſalts deepen the colour of ſpirituous tinctures, but add nothing to the diſſolving power of the menſtruum: nor is the addition of theſe ſalts uſeleſs only, but likewiſe prejudicial, as they injure the flavour of aromatics, and ſuperadd a quality ſometimes contrary to the intention of the medicine. Volatile alkaline ſalts, in

many caſes, promote the action of the ſpirit; but acids, almoſt univerſally, weaken it. See the articles ALKALI and ACID.

As to the method of extracting tinctures, the following general rules may be of uſe in this reſpect. 1. The vegetable ſubſtances ought to be moderately and newly dried, unleſs they are expreſly ordered otherwiſe; they ſhould likewiſe be cut and bruiſed before the menſtruum is poured on them. 2. If the digeſtion is performed in balneo, the whole ſucceſs depends upon a proper management of the fire: it ought to be all along gentle, unleſs the hard texture of the ſubject ſhould require it to be augmented; in which caſe the heat may be ſo increaſed as to make the menſtruum boil a little towards the end of the proceſs. 3. Very large circulatory veſſels ought to be employed for this purpoſe, which ſhould be heated before they are luted together. A commodious circulatory may be compoſed of two long-necked matraſſes or bolt-heads, the mouth of one of which is to be inſerted into that of the other, and the junĉture ſecured by a piece of wet bladder. The uſe of heating the veſſels is, to expel a part of the air; which otherwiſe, rarifying in the proceſs, would endanger burſting them, or blowing off the uppermoſt matraſs. 4. The veſſel is to be frequently ſhaken during the digeſtion. 5. All tinctures ſhould be ſuffered to ſettle before they are committed either to the filter or ſtrainer. 6. In the tinctures, and diſtilled ſpirits likewiſe, deſigned for internal uſe, no other ſpirit, drawn from malt, melaſſes, or other fermented matter, is to be uſed, than that expreſly preſcribed.

Of tinctures there are various ſorts, and for various uſes; cephalic tinctures, antiſcorbutic tinctures, ſtomachic tinctures, anticolic tinctures, and invigorating tinctures; there are tinctures drawn from roſes, from cinnamon, and an infinite number of other ſubſtances, which it would be too tedious to mention.

TINCTURE, in heraldry, the hue or colour of any thing in coat-armour, under which denomination may alſo be included the two metals, or and argent, becauſe they are often repreſented by yellow and white. See COLOUR and METAL.

TINE. There are two rivers of this name, the one called North-Tine, which riſes on the borders of Scotland; and the other South-Tine, which riſes on the confines of Cumberland; the one running ſouth-eaſt, and the other north-eaſt; they unite their waters at Hexham, and continuing to run eaſt, divide the counties of Durham and Northumberland, paſſing by Newcaſtle, and falling into the German ſea at Tinmouth.

TINEA, in medicine, a diſeaſe, the ſame with the achor or cruſta lactea. See ACHOR, CRUSTA, and LACTEA.

TIN-GLASS, a name given by ſome to a mineral matter more commonly called biſmuth. See BISMUTH.

TINMOUTH, a port-town of Northumberland, ſituated on the German-ſea, at the mouth of the river Tine, ſeven miles eaſt of Newcaſtle.

TINNING, the covering or lining any thing with melted tin, or with tin reduced to a very fine leaf. Looking-glaſſes are foliated, or tinned, with thin plates of beaten tin, the whole bigneſs of the glaſs, applied or faſtened thereto by means of quickſilver. See the article FOLIATING.

The plumbers, on ſome occaſions, tin or whiten their ſheets of lead, in order to which they have a tinning-furnace, filled with live coal, at the ſides whereof two men are placed, who hold up the ſheets over the fire to heat; and the tin leaves being laid over them as faſt as the ſheets grow hot, and the tin melts, they ſpread it, and make it take by rubbing it with tow and roſin.

TINNITUS AURIUM, a noiſe or buzzing in the ear, when it receives ſounds which do not exiſt, or at leaſt which are not produced by the motion of the external air; and the ear being filled with a certain ſpecies of ſound, cannot admit other ſounds, unleſs they are very violent. The tinnitus is of two kinds, the one proceeding from a diſtemperature of the organ of hearing, the other from a diſorder of the brain.

The cure, according to Heiſter, is to be performed by temperate diaphoretic powders, and reſolving eſſences, commonly called anticatarrhales; as of amber, the woods, roſemary, together with diaphoretics and alexipharmacs, taken often in a day, with tea of betony, with roſemary-flowers, ſage, or lavender, or or ſaſſafras. In the morning, and at noon, the eſſences are to be taken, and at night the powders. Eſſence of amber may be applied outwardly, either alone or with a few drops of oil of amber, or one or two drops of oil of camomile put into

into the ear with cotton, morning and evening; or a grain or two of amber and muſk, or caſtor, in cotton, either alone or with peruvian-balſam; or carminative oils, ſuch as aniſe, fennel, carraways, or camomile; not neglecting pediluvia, and frequent rubbing of the feet and head. Many have been alſo cured by the vapour of a decoction of lavender-flowers, or roſemary, made with wine, being conveyed to the ear by a funnel. If the diſeaſe is obſtinate and inveterate, the patient muſt bleed in the foot, together with ſcarifications, and frequent purges, for the ſake of revulſion. Etmuller ſays, this noiſe, proceeding from burning fevers, will go away of itſelf; but if it proceeds from chronic diſorders, it is difficult of cure. However, he recommends vapours of ſouthern-wood, wormwood, origanum, eyebright, balm, *&c.* as alſo of amber, or gum-ammoniac; likewiſe oil of peach kernels, and ſpirit of urine, put into the ear with cotton.

The following formula is greatly praiſed. White hellebore and caſtor, take of each two drachms; of coſtmary, one drachm and a half; of rue, two drachms; euphorbium, half a drachm; of bitter-almonds, two drachms and a half: let them be boiled in the oil of rue, and poured warm into the ear. Shaw recommends half an ounce of oil of bitter-almonds, with two drachms of oil of caſtor, externally applied.

TINNUNCULUS, in ornithology, the ſame with keſtril. See KESTRIL.

TINO, an iſland in the Archipelago, ſituated in eaſt long. 26°, north lat. 37° 15'.

TINUS LAURISTINE, in botany, a genus of the *pentandria trigynia* claſs of plants, the corolla whereof conſiſts of a companulated, ſemiquinquifid, obtuſe petal, with ſubcordated laciniæ: the fruit is a roundiſh unilocular berry, umbilicated, with a cloſe calyx: the ſeed is ſingle and globoſe. Some botaniſts make this genus a ſpecies of viburnum. See the article VIBURNUM.

TIPPERARY, a county of Ireland, in the province of Munſter, lying between King's county on the north, and Waterford on the ſouth.

TIPRA, a country of Aſia, ſituated between India and China.

TIPSTAFF, an officer who attends the judges with a kind of ſtaff tipt with ſilver, and takes into his charge all priſoners who are committed or turned over at a judge's chambers.

TIRE, or TEER *of guns*, in the ſea-language, is a row of cannon placed along a ſhip's ſide, either above, upon deck, or below, diſtinguiſhed by the epithets of upper and lower tires.

TIRLEMONT, a town of Brabant, twelve miles ſouth-eaſt of Louvain, and twenty-one north of Namur.

TIROL, a country of Germany, in the circle of Auſtria, about one hundred and twenty miles long, and ſixty broad, ſubject to the houſe of Auſtria: it is bounded by Swabia and Bavaria on the north.

TITANS, in the heathen mythology, the offſpring of Titan, the elder brother of Saturn, upon whom, and his ſon Jupiter, they made war, in order to recover the ſovereignty of which Titan had been deprived. The poets repreſent them as a race of giants, ſprung from the earth, and invading heaven; and tell us, that Jupiter overcame them with thunder, and drove them down to the very bottom of hell.

TITHES, *decimæ*, in law, denote the tenth part of the increaſe that annually ariſes from the profits of lands, and the induſtry of the pariſhioners, which is payable for the maintenance of the parſon of the pariſh.

Tithes, it is obſerved, are of three kinds, predial, perſonal, and mixed. Predial-tithes are ſuch as immediately ariſe from the land, whether it be by manuring or its own nature; as corn, grain, hay, wood, fruit, and herbs, which are ſaid to be due without deducting the coſts. Perſonal-tithes are thoſe which only ariſe from a perſon's labour and induſtry, they being a tenth part of his gains in trade, *&c.* after charges deducted; but this is ſeldom paid in England, and when it is, it is always due by cuſtom, and payable where the party dwells, hears divine ſervice, *&c.* Mixed-tithes are ſuch as ariſe not directly from the ground, but from cattle and other things that receive their nouriſhment from and are maintained thereout; as calves, colts, pigs, wool, lambs, milk, *&c.* Tithes are further divided into great and ſmall; great, are corn, hay, and wood; ſmall comprehend all other predial-tithes beſides corn, *&c.* as likewiſe ſuch tithes as are perſonal and mixed: the great tithes generally belong to the rector, and the ſmall to the vicar.

It has been held, that where land is barren, and not manurable, without extraordinary charge, ſuch land being converted into tillage, ſhall, for the firſt ſeven years after the improvement, be free from paying tithes; but during that ſpace of time it ſhall pay ſmall tithes, as have been uſually paid before, and afterwards the full tithe, according as it is improved: nevertheleſs, if land is ſuffered to be over-run with buſhes, or become unprofitable through want of huſbandry, in that caſe it cannot properly be called barren; and if the ſame be grubbed up, or ploughed and ſowed, it immediately pays tithes.

As to corn it is tithed by the tenth cock, or ſheaf, which if the owner does not ſet out, he is liable to an action upon the ſtatute; likewiſe where a pariſhioner will not ſow the land, the parſon may bring his action againſt him. On the other hand, when the tithes are ſet forth, if the parſon do not carry them away in a reaſonable time, but lets the ſame be too long on the ground, to the prejudice thereof, he may be alſo ſubject to an action.

The treble damages, granted by ſtatute, are recoverable in the temporal courts by action of debt, thoſe damages not being limited where to be recovered; and it is the opinion of ſome, that the double value, or damages, above-mentioned may be recovered in the ſpiritual-court, for this reaſon, that the perſon grieved may ſue in the eccleſiaſtical-court for the tithes themſelves, or a recompence in lieu of the ſame, and may alſo at the ſame time have the double value. Small-tithes that are under the value of forty ſhillings, a parſon may recover before two juſtices of peace, who are no way intereſted in the tithes, within twenty days after demand, and two years after due: and the juſtices may, by diſtreſs, levy the money by them adjudged, upon the party's refuſal to pay it, ten days after notice, *&c.* The juſtices may likewiſe award coſts not above ten ſhillings, but with liberty to appeal to the quarter-ſeſſions, whoſe judgment ſhall be final, unleſs the title to ſuch tithes ſhould come in queſtion, *&c.*

Where a quaker refuſes either to pay or compound for great or ſmall tithes, the two next juſtices of the peace may, on complaint thereof made, ſummon ſuch quaker before them, and after examining the matter of complaint on oath, may, by order under their hands and ſeals, direct the payment in all caſes under ten pounds. And if, after ſuch order made, the quaker refuſes to comply therewith, any one of the juſtices may by warrant order the ſame to be levied by diſtreſs, *&c.* See 7 and 8 Wil. III. c. 34. which, by 1 Geo. I. c. 6. is made perpetual.

Notwithſtanding theſe acts, tithes, if of any conſiderable value, are generally ſued for in the exchequer by engliſh bill, except where the ſuit is founded on the ſtatute of 2 and 3 Ed. VI. for double or treble value, *&c.*

TITHING, in old law-books, the ſame with decennary. See DECENNARY.

TITLE, *titulus*, an appellation of dignity, or quality, given to princes, and other perſons of diſtinction. Thus, the title of his Britannic majeſty, is king of Great-Britain, France, and Ireland; that of the French king, is king of France and Navarre: and ſo of others. The pope aſſumes the title of holineſs, and the cardinals that of eminence, *&c.* See the articles KING, PRINCE, DUKE, POPE, CARDINAL, *&c.*

TITLE, in law, denotes any right which a perſon has to the poſſeſſion of a thing; or an authentic inſtrument, whereby he can prove his right. See the articles RIGHT, PROPERTY, *&c.*

As to the titles of the clergy, they denote certain places wherein they may exerciſe their functions. There are ſeveral reaſons why a church is called titulus; but that which ſeems to be the beſt, is becauſe antiently the name of the ſaint to whom the church was dedicated, was engraved on the porch, as a ſign that the ſaint had a title to that church; and from thence the church itſelf was afterwards called titulus. In this ſenſe a title ſignifies the church to which a clergyman was admitted, and where he is conſtantly to reſide: and by the canons none ſhall be ordained without a title. This is in order to keep out ſuch from the miniſtry who, for want of maintenance, might bring a diſgrace upon the church: can. 31. In ſhort, according to ſome writers, ſuch a title is an aſſurance of being preferred to an eccleſiaſtical benefice; that is to ſay, a certificate that the clerk is provided of ſome church or place, or where the biſhop that ordains him, intends ſhortly to admit him to a benefice or curacy then void.

TITMOUSE, *parus*, in ornithology, a genus of birds, of the order of the paſſeres,

feres, the beak of which is of a ſubulated form, and the point of the tongue truncated.

Of this genus there are many elegant ſpecies, among which the creſted and blue titmouſe are not the leaſt beautiful. See plate CCLXXXV. fig. 6. where n° 1. repreſents the former, and n° 2. the latter.

TITUBATION, or TREPIDATION, a kind of libration, or ſhaking, which the antient aſtronomers attributed to the cryſtalline heavens, in order to account for certain irregularities which they obſerved in the motions of the planets. See PLANET and LIBRATION.

TITUL, a town of Hungary, ſituated on the river Teiſſe, thirty miles north of Belgrade.

TITULAR, denotes a perſon inveſted with a title, in virtue of which he holds an office or benefice, whether he perform the functions thereof or not.

The appellation of titular is frequently alſo given to a perſon who has the title and right of an office or benefice, but without having poſſeſſion, or diſcharging the functions thereof.

TIVERTON, a borough of Devonſhire, ſituated on the river Ex, thirteen miles north of Exeter.

It ſends two members to parliament.

TIVIOT, or CHIVIOT-MOUNTAINS, are high hills on the borders of England and Scotland.

TIVOLI, or TIBUR, a town of Italy, ſituated on the river Tiverone, twenty miles eaſt of Rome.

TLASCALA, a town of Mexico, and capital of a province of the ſame name, about forty-five miles eaſt of the city of Mexico.

TMESIS, τμησις, in grammar, a figure whereby a compound word is ſeparated into two parts, and one or more words placed between them: thus, for *quæcunque*, Virgil ſays, *quæ me cunque vocant terræ*, &c.

TOAD, *rubeta*, in zoology, belongs to the ſame genus with the common frog. See the article FROG.

The toad is larger than the frog, with a thick body, a broad back, and the belly ſwelled and inflated: its ſkin is conſiderably thick, and full of tubercles, of a duſky and blackiſh colour on the back, and ſpotted on the belly: it is naturally a loathſome and diſagreeable object. See plate CCLXXIX. fig. 2.

TOAD-FLAX, *linaria*, in botany. See the article LINARIA.

TOBACCO, *nicotiana*, in botany, a genus of the *pentandria-monogynia* claſs of plants, the corolla of which conſiſts of a ſingle infundibuliform petal, the limb whereof is patulous, and lightly divided into five ſegments: the fruit is a biloculär capſule, of a nearly oval figure, with a line on each ſide of it, and containing numerous, kidney-ſhaped, and rugoſe ſeeds. See plate CCLXXIX. fig. 3.

Tobacco is a native of the eaſt and weſt Indies, and particularly the iſland Tobago, or Tabago; whence the engliſh name. See TABAGO.

After ſowing tobacco-ſeeds, the ground is watered every day, and in hot weather covered, to prevent its being ſcorched by the ſun; and when the plants are grown to a convenient pitch, they are tranſplanted into a ſoil well prepared for their reception: care is alſo taken to keep this ground clear of weeds, and to pull off the loweſt leaves of the plant, that ten or fifteen of the fineſt leaves may have all the nouriſhment. When theſe leaves are ripe, which is known by their breaking when bent, the ſtalks are cut, and left to dry two or three hours in the ſun; after which they are tied together two and two, and hung on ropes under a ſhade to be dried in the air. And when the leaves are ſufficiently dried, they are pulled from off the ſtalks, and made up in little bundles; which being ſteeped in ſea-water, or, for want thereof, in common water, are twiſted in manner of ropes, and the twiſts formed into rolls, by winding them with a kind of mill around a ſtick: in which condition it is imported into Europe, where it is cut by the tobacconiſts for ſmoaking, formed into ſnuff, and the like. See the article SNUFF.

Beſides the tobacco of the Weſt-Indies, there are conſiderable quantities cultivated in the Levant, the coaſts of Greece and the Archipelago, the iſland of Malta and Italy.

The marks of good twiſt-tobacco, are a fine ſhining cut, an agreeable ſmell, and that it have been well kept. Tobacco is either taken by way of ſnuff, as a ſternutatory, or as a maſticatory, by chewing it in the mouth, or by ſmoaking it in a pipe. It is ſometimes alſo taken in little longiſh pellets put up the noſe, where it is found to produce very good

effects,

effects, to attract a deal of water or pituita, unload the head, resolve catarrhs, and make a free respiration; for the subtile parts of the tobacco in inspiration, are carried into the trachea and lungs, where they loosen the peccant humors adhering thereto, and promote expectoration. Some have left this tobacco in their noses all night; but this is found to occasion vomiting the next morning. Another thing charged on this way of application, is, that it weakens the sight. When taken in great quantities in the way of snuff, it is found to prejudice the smelling, greatly diminishes the appetite, and in time gives rise to a phthisis. That taken in the way of smoak, dries and damages the brain. Borrhi, in a letter to Bartholine, mentions a person who through excess of smoaking had dried his brain to that degree, that after his death there was nothing found in his skull but a little black lump, consisting of mere membranes.

Some people use the infusion of tobacco as an emetic; but it is a very dangerous and unjustifiable practice, and often produces violent vomitings, sickness and stupidity.

Bates and Fuller give some receipts, in which tobacco is an ingredient, with mighty encomiums in asthmatic cases. A strong decoction of tobacco, with proper carminatives and cathartics, given clyster-wise, sometimes proves of good effect in what is usually called the stone-cholic, and also in the iliac passion. A drop or two of the chemical oil of tobacco, being put on the tongue of a cat, produces violent convulsions, and death itself in the space of a minute; yet the same oil used in lint, and applied to the teeth, has been of service in the tooth-ach though it must be to those that have been used to the taking of tobacco, otherwise great sickness, retchings, vomitings, *&c.* happen; and even in no case is the internal use of it warranted by ordinary practice.

A strong decoction of the stalks, with sharp-pointed dock and alum, is said to be of good service, used externally, in cutaneous distempers, especially the itch: some boil them for that purpose in urine. The same is said to be infallible in curing the mange in dogs.

Beat into a mash with vinegar, or brandy, it has been found serviceable for removing hard tumours of the hypochondria.

Tobacco makes a considerable article of commerce; that imported from the british plantations, pays a duty of $5\frac{1}{2}$d. the pound, which is wholly drawn back on exportation: also, if all the duties are paid down at entry, 25 per cent. is allowed in lieu of all former encouragements; or the importer may pay down the old subsidy, which is $\frac{1}{4}$ of a penny per pound, and give bond for the payment of the remaining duties in eighteen months, and only have an allowance of 15 per cent. out of the bondable duties: so that the duties upon a pound of british plantation tobacco, when the bondable duties are secured as above, amount to $6\frac{13\frac{1}{3}}{100}$d. which is drawn back on exportation. But if the importer shall be desirous to discharge his bond, or any part thereof, before the expiration of eighteen months, he shall be abated upon such bond so much as the discount at the rate of 7 per cent. per annum shall amount to, in proportion to the time unexpired. No tobacco can be imported into the kingdom of Great Britain, otherwise than in casks, chests, or cases; each cask, chest, or case, containing 450 lb. weight of neat tobacco at least, under the penalty of the forfeiture of all such tobacco. Also no tobacco unmanufactured shall be exported but in casks, chests, or cases of 425 lb. weight, or more, of neat tobacco, except what is exported by way of samples: and all tobacco must be shipped from the very same port or place, in the original package, and with the same marks, as it was first imported, without any alteration, except necessary cooperage, under the penalty of the forfeiture of all such tobacco.

By an act passed in the twenty-fourth year of his present majesty George II. no tobacco shall be manufactured till an account is given to the chief officer of the customs at the port of importation, of the mark and quantity of the cask so delivered to be manufactured; and if such an account shall not be given in, or is found to be fraudulent, the importer shall forfeit 30 l. for every hogshead, *&c.* And by the same act, no tobacco, or tobacco-stalks, exceeding 24 lb. nor any snuff, exceeding 10 lb. shall be conveyed by land from the place of importation, without a certificate first obtained from the chief custom-house officers in that port, together with the importer's oath thereto,

thereto, that the duties were paid or ſecured at the importation, &c. on pain of forfeiting the tobacco and ſnuff; as alſo the carriage and horſes, and the carrier to be impriſoned for one month: and if any perſon ſhall counterfeit or alter ſuch certificate, or procure the ſame to be done, he ſhall forfeit 50l. for every ſuch offence. Alſo, if any tobacco be conveyed by water, without being duly entered at the cuſtom-houſe, and a certificate as above obtained, it ſhall be forfeited, and the maſter of the veſſel ſhall alſo forfeit 6d. per pound. The penalty for counterfeiting ſuch a certificate is 100l. What has been ſaid of conveying tobacco from the place of importation, holds equally of conveying it from any other place, without a certificate as above.

Tobacco muſt not be cultivated in England, except in phyſic gardens, on forfeiture of 40s. for every rood of ground planted with it. Alſo, if any perſons cut the leaves of walnut-tree, ſo as to reſemble thoſe of tobacco, and ſell the ſame mixed therewith, they ſhall forfeit 5s. per pound.

TOBAGO, a ſmall iſland in the bay of Panama, in ſouth America, ſituated weſt long. 82°, north lat. 8°.

TOBAGO, or TABAGO, is alſo the name of one of the Caribee-Iſlands. See the article TABAGO.

TOBOLSKI, the capital of Siberia, ſituated at the confluence of the rivers Tobal and Irtis: eaſt long. 63°, north lat. 57° 30′.

TOCAT, the capital of Amaſia, in Aſia: eaſt long. 37°, and north lat. 41° 30′.

TOCKAY, a city of Hungary, ſeventy miles north eaſt of Buda, the wines of which are eſteemed the beſt in Europe.

TOD *of wool*, a quantity containing twenty-eight pounds, or two ſtone. See the articles WOOL and WEIGHT.

TODI, a town of Italy, ſituated on the river Tiber, fifty miles north of Rome.

TOES, called by anatomiſts *digiti pedis*, are the extreme diviſions of the feet, anſwering to the fingers of the hands. See the articles FOOT and HAND.

The bones of the toes of both feet are twenty-ſix in number, ſometimes twenty-eight; being much ſlenderer, except that of the great toe, than thoſe of the fingers: they have alſo a much leſs free motion than thoſe of the fingers: the great toe has only two bones, and the reſt three; except the little toe in very old people, in whom the two extreme phalanges of the little toe grow together ſo as to form only one bone; whence we find, in this caſe, fewer bones in each foot than thirteen.

For the ſeſamoide bones of the toes, ſee the article SESAMOIDE.

In caſe of adheſſions of the toes of infants, they ſhould be ſeparated either by cutting out the intermediate ſkin with a pair of ſciſſars, or barely by dividing them with the ſame inſtrument: and when this is done, in order to prevent their cohering again, they ſhould be wrapped up in a ſpiral bandage, dipped in lime-water and ſpirit of wine.

TOFT, in law-books, denotes a parcel of land, or a place where a meſſuage has formerly ſtood.

TOGA, in roman antiquity, a wide woollen gown, or mantle; which ſeems to have been of a ſemi-circular form, without ſleeves; differing both in richneſs and largeneſs, according to the circumſtances of the wearer, and uſed only upon occaſion of appearing in public.

Every body knows that the toga was the diſtinguiſhing mark of a Roman: hence, the jus togæ, or privilege of the toga, was the ſame with the privilege of a roman citizen; *i. e.* the right of wearing a roman habit, and of taking, as they explain it, fire and water through the roman empire.

TOILS, ſnares or nets uſed by hunters for catching wild beaſts, as deer, &c.

TOILET, a fine cloth of linnen, ſilk, or tapeſtry, ſpread over the table in a bedchamber or dreſſing-room, to undreſs and dreſs upon.

TOISE, a french meaſure containing ſix of their feet, or a fathom. See FOOT.

TOISON D'OR, a term, in heraldry, for a golden fleece, which is ſometimes borne in a coat of arms.

TOLEDO, a city of New Caſtile, in Spain; the archbiſhop of which is primate of Spain, &c. and poſſeſſes the largeſt revenue of any archbiſhop in Europe: it is ſituated in weſt long. 4° 12′, and north lat. 39° 45′.

TOLEN, the capital of an iſland of the ſame name, in the province of Zealand, in the United Netherlands, ſituated four miles north weſt of Bergenopzoom.

TOLENTINO, a town of the marquiſate of Ancona, in Italy, twenty-four miles ſouth-weſt of Loretto.

TOLERATION, in matters of religion, is either civil or eccleſiaſtical. Civil toleration,

leration, is an impunity and ſafety granted by the ſtate to every ſect that does not maintain doctrines inconſiſtent with the public peace: and eccleſiaſtical toleration, is the allowance which the church grants to its members to differ in certain opinions, not reputed fundaments.

The term toleration has made a great figure in the diſputes among proteſtants, who have been exceedingly divided about the meaſures of toleration, or the degrees to which heretics and ſchiſmatics are, or are not to be ſuffered.

TOLESBURG, a port-town of Livonia: eaſt long. 26°, north lat. 59°.

TOLHUYS, a town of Guelderland, in the United Netherland, ſituated on the Rhine, nine miles eaſt of Nimeguen.

TOLK, in ornithology, the black, brown, and white mottled tringa. See the article TRINGA.

TOLL, in law, denotes a tax or cuſtom paid for paſſage, or for the liberty of ſelling goods in a market or fair. Hence, toll-booth is a place in a town, where goods are weighed, in order to aſcertain the duties thereon.

TOLMEZZO, a town of Friuli, in Italy eaſt long. 13°, north lat. 47°

TOLNA, a town of Lower Hungary, ſixty miles ſouth of Buda.

TOLOSA, a city of Biſcay, in Spain: weſt long. 2°, and north lat. 43° 30'.

TOLU, a port-town of Terra Firma, ſituated on a bay of the North ſea, an hundred miles ſouth weſt of Carthagena.

TOLUIFERA, in botany, a genus of the *decandria monogynia* claſs of plants, the flower of which is compoſed of five petals, which are inſerted into the cup; four of theſe are ſtrait and equal in ſize, and are a little longer than the cup; but the fifth is twice as large as theſe, and is cordated at the end, and has an unguis of the length of the cup. The fruit and ſeeds are yet unknown. It is ſo called, from its producing the balſam of peru. See the article BALSAM.

TOMAN, or TOUMAN, a kind of imaginary money uſed among the Perſians in the keeping of their books, and to facilitate the reduction of money in the payment of conſiderable ſums. See the article MONEY.

TOMB, includes both the grave or ſepulchre wherein a defunct is interred, and the monument erected to preſerve his memory. See MONUMENT.

TOMBEC, a town of Brabant, ten miles eaſt of Bruſſels.

TOME, in matters of literature, denotes a bound book, or writing that juſt makes a volume. See BOOK and VOLUME.

TOMENTUM, among botaniſts, the downy matter which grows on the leaves of ſome plants.

TOMEUT, a town of Nigritia, in Africa: weſt long. 11°, north lat. 14°.

TONDEREN, or TUNDER, a town of ſouth Jutland, ſituated on a bay of the German ſea, twenty miles ſouth of Rypen.

TONE, or TUNE, in muſic, a property of ſound, whereby it comes under the relation of grave and acute; or it is the degree of elevation any ſound has, from the degree of ſwiftneſs of the vibrations of the parts of ſonorous bodies. See the articles SOUND and TUNE.

Tone is more particularly uſed for a certain degree or interval of tune, whereby a ſound may be either raiſed or lowered from one extreme of a concord to the other, ſo as ſtill to produce true melody. See INTERVAL and CONCORD.

TONGEREN, or TONGERS, a town of the biſhopric of Liege, in Germany, ten miles north weſt of Liege.

TONGUE, *lingua*, in anatomy, the primary organ of taſte and ſpeech; the figure of which approaches, in ſome degree, to pyramidal; its anterior part being called apex, and its poſterior part the baſe or root. The upper ſide is not quite flat, but a little convex, and divided into two lateral halves, by a ſhallow depreſſed line called linea linguæ mediana. The edges are thinner than the other parts, and a little rounded as well as the point. The lower ſide reaches only from the middle of the length of the tongue to the point.

The tongue is principally compoſed of very ſoft fleſhy fibres, intermixed with a peculiar medullary ſubſtance, and diſpoſed in various manners. Many of theſe fibres are confined to the tongue without going any farther; the reſt form ſeparate muſcles which go out from it in different ways, and are inſerted in other parts: all the upper ſide of the tongue is covered by a thick membrane of a papillary texture, upon which lies another very fine membrane like a kind of epidermis, which is likewiſe continued over the loweſt ſide, but without papillæ.

Three ſorts of papillæ may be diſtinguiſhed in the upper ſide of the tongue, capitatæ, ſemi-lenticulares, and villoſæ. Thoſe of the firſt kind are the largeſt, reſembling

reſembling little muſhrooms with ſhort ſtems, or buttons without a neck: they lie on the baſis of the tongue, in ſmall ſuperficial foſſulæ. They reſemble ſmall conglomerate glands ſeated on a very narrow baſis, and each of them has ſometimes a ſmall depreſſion in the middle of their upper convex ſide: they occupy the whole ſurface of the baſis of the tongue, and are ſituated near each other, in ſuch a manner as that the moſt anterior form an angle; they are glandular papillæ, or ſmall ſalival or mucilaginous glands, of the ſame kind with thoſe that are to be deſcribed hereafter.

We often obſerve, about the middle of this part of the tongue, a particular hole of different depths; the inner ſurface of which is intirely glandular, and filled with ſmall papillæ like thoſe of the firſt kind. It is called foramen cæcum Morgagnii, as being firſt deſcribed by that author; ſince that time Vaterus has diſcovered a kind of ſalival ducts belonging to it; and Heiſter found two of theſe ducts very diſtinctly, the orifices of which were in the bottom of the foramen cæcum, near each other. He obſerved the ducts to run backward, divaricating a little from each other; and that one of them terminated in a ſmall oblong veſicle, ſituated on the ſide of the ſmall cornu of the os hyoides.

The papillæ of the ſecond kind, or ſemilenticulares, are ſmall orbicular eminences, only a little convex, their circular edge not being ſeparate from the ſurface of the tongue. When we examine them in a ſound tongue with a good microſcope, we find their convex ſides full of ſmall holes or pores, like the end of a thimble.

They lie chiefly in the middle and anterior portions of the tongue, and are ſometimes moſt viſible on the edges, where they appear to be very ſmooth, and poliſhed even to the naked eye, and ſometimes in living ſubjects. They ſoon loſe their conſiſtence after death, ſo that, by rubbing them ſeveral times, they may be drawn out in form of ſmall ſoft pyramids, inclined to one ſide. The papillæ of the third kind, or villoſæ, are the ſmalleſt and moſt numerous. They fill the whole ſurface of the upper ſide of the tongue, and even the interſtices between the other papillæ. They would be more properly named papillæ conicæ, than villoſæ, from the figure which they appear to have, when examined through a microſcope in clear water. They are naturally ſoftiſh, but become extremely flaccid after death; ſo that by handling them they may be made ſhort and thick, whereas they are naturally long and ſmall.

The fleſhy fibres of which the tongue is compoſed, and which go no further than the tongue, may be termed muſculi linguæ interiores, or the intrinſic muſcles; and they are the ſame with what Spigelius named muſculi linguales. The fibres theſe muſcles conſiſt of are of three general kinds, longitudinal, tranſverſe, and vertical; and each of theſe ſituations admits of different degrees of obliquity. The longitudinal fibres point to the baſis and apex of the tongue, and ſeem partly to be expanſions of the muſculi ſtylogloſſi, hyo-gloſſi, and genio-gloſſi. The vertical fibres ſeem likewiſe to be in part produced by the ſame genio-gloſſi, and the tranſverſe by the mylo gloſſi.

Beſides theſe mixed productions, there is a diſtinct plane of longitudinal fibres, which run near the ſurface of the upper ſide of the tongue, and a diſtinct tranſverſe plane under them. All theſe fibres are partly interwoven, one portion of them terminating at the two edges of the tongue, and the other at the baſis and point, without going to any other part; and they lie immediately above thoſe which belong to the genio gloſſi. To diſcover all theſe different fibres, and their different degrees of direction, we need only cut the tongue longitudinally, after it has been boiled, or long macerated in ſtrong vinegar. The extrinſic muſcles, or muſculi exteriores, are thoſe which by one extremity make a part of the body of the tongue, and are fixed by the other in ſome part without the tongue. Of theſe we reckon four pair, mylo gloſſi, ſtylo-gloſſi, hyo-gloſſi, and genio-gloſſi.

In plate CCLXXIX. fig. 5. n° 1. is repreſented the human tongue, with its three integuments, which anatomiſts in general have omitted to remark. Bourdon, indeed, has figured them, but thicker than the life. A A A is the upper ſuperfices of the tongue, on which are viſible a multitude of papillary and pyramidal eminences. B is a piece of the exterior tunic, or coat of the tongue; in which are diſcernable a vaſt number of nervous papillæ, adhering to its interior ſurface. C C is the ſecond tunic, called the corpus reticulare of Malpighi. D is the corpus reticulare of other writers. E is the

membrane, or corpus papillare nervoſum. FF the glands of the tongue; and G the foramen uſually found in the hinder part of the tongue.

N° 2. *ibid.* exhibits a human tongue, in which Heiſter diſcovered two remarkable ſalival ducts, *b* and *d*, in the foramen cæcum A; *c c* is a veſicle at the extremity of the duct *d*, diſtended with ſaliva; and *e* is the place where this duct diſappeared: *f f* ſhew the courſe and ſituation of theſe ducts. The fabric and ſtructure of the oſcula, expreſſed at *b* and *d*, was ſingular; having the appearance of valves or caruncles, that had collapſed, ſo that they did not appear as repreſented in the figure, unleſs forced open by inflation: *b* is the epiglottis, *i* its anterior ligament, *k* muſcular fibres ariſing from the ſubſtance of the tongue, *l l* two little oſſicles of the os hyoides, *m m* the extremities of the horns of the os hyoides, *n n* glands and papillæ of various ſize, about the middle of the tongue; and *o* the apex of the tongue bent downwards.

TONGUE-TIED, the popular name for a diſtemper of the tongue in children, when it is tied down too cloſe to the bottom of the mouth, by a ligament connected all along its middle, and called its frænulum, which requires to be divided, to give the tongue its proper motion. See the article FRÆNUM.

This is ſometimes the caſe in adults, but oftener in children, who cannot then exert their tongues to ſuck. This is, however, by no means ſo common as the women uſually imagine; not ſo much as one child in a thouſand being afflicted with it; nor is the operation in cutting it of little conſequence, ſince often bad accidents follow it, and ſometimes the loſs of the child's life. When the infant can put its tongue out of its mouth, the frænulum wants no inciſion; but when the tongue cannot be extended beyond the teeth, the operation is neceſſary. To perform this, the end of the tongue ſhould be covered with a linnen-rag, and held with the fingers to prevent its ſlipping, and the ligament of the tongue running between the ranular veins and internal ſalival ducts, is to be divided by a pair of obtuſe-pointed ſciſſars, till it give room enough for ſucking or ſpeaking: but in doing this, great care muſt be taken not to wound the ſalival ducts, or the proper veins and arteries of the tongue; for children have been known to periſh upon the ſpot, from the cutting the ranular veins in this operation. Midwives often tear this ligament with their fingers, as ſoon as the child is born; but this is a dangerous and bad practice.

TONIC, τονικὸς, in medicine, is applied to a certain motion of the muſcles wherein the fibres, being extended, continue their extenſions in ſuch a manner, as that the part ſeems immovable, though in reality it be in motion.

TONNAGE, or TUNNAGE. See the article TUNNAGE.

TONNINGEN, a port-town of ſouth Jutland, ſituated at the mouth of the Eyder, in eaſt long. 8° 40′, north lat. 54° 40′.

TONQUIN, a kingdom of the further India, bounded by the provinces of Yunam and Canton, in China, on the north; by Cochin China, on the ſouth; and by the kingdom of Laos, on the weſt; lying between 101° and 108° eaſt long. and between 17° and 26° north lat. Its capital is Kecelo, or Cachao.

TONSBURG, a port-town of Norway, in the province of Aygerhuys, ſituated on the Scaggerack-ſea, thirty miles weſt of Frederickſtat.

TONSILS, *tonſillæ*, in anatomy, two remarkable glands, ſituated one on each ſide of the mouth, near the uvula, and commonly called almonds of the ears, from their reſembling almonds in figure. Their uſe is to ſecrete a mucous humour for lubricating the paſſages: this they diſcharge by ſeveral irregular but conſpicuous foraminæ into the mouth.

The tonſils are apt to be inflamed from taking cold, for which Heiſter firſt adviſes a gentle purge of tamarinds, ſena, and cream of tartar; and this to be repeated to the third or fourth doſe, if there be occaſion: in the intermediate times, the diaphoretic attemperating and nitrous medicines are to be given in powders, and a large quantity of diluting liquors allowed, which ſhould be gently acidulated, and have a ſmall quantity of nitre diſſolved in them: gargariſms made of decoctions of biſtort-root, red-roſes, and other gentle aſtringents, are alſo to be frequently uſed; and the frequent waſhing the feet in warm water, often has a very remarkable good effect.

If after four or five days the diſtemper is found not to give way to theſe means, but the tumour ſtill remains, there is then but little hopes to be had of its reſolution, and a very different end is to be attempted: emollient gargariſms are now to be uſed, and maturating plaſters externally applied,

applied, ſuch as diachylon with the gums, and the like; and ſuppurating cataplaſms are to be applied to the whole neck and throat: theſe methods are to be continued till the tumour either burſts of itſelf, or is ſo ripe as to be fit for opening by the hand of the ſurgeon. After this has been done, and the matter is diſcharged, gargariſms muſt be uſed of decoctions of ſome vulnerary herb; or common green tea, ſweetened with honey of roſes, may be uſed to ſerve the purpoſe. The mouth and throat are to be frequently waſhed with this till the part is healed. It is to be obſerved, however, that the reſolution of theſe tumours is never to be deſpaired of, not even during the uſe of the ſuppurating medicines, for it is often ſeen that the tumour has been wholly diſcuſſed even during the uſe of theſe means, the reſolution often being extremely ſlow.

This is a very troubleſome complaint, and with ſome perſons is apt to return very frequently; the beſt preſervative againſt it is a moderate diet and bleeding, about the time of the equinoxes, either in the arm or foot. Some have found it neceſſary to open an iſſue in the arm, in this caſe, and have been by this means perfectly cured; but on its drying up have always found the diſeaſe return.

TONSURE, in eccleſiaſtical hiſtory, a particular manner of ſhaving or clipping the hair of eccleſiaſtics or monks.

The antient tonſure of the clergy was nothing more than polling the head, and cutting the hair to a moderate degree, for the ſake of decency and gravity: and the ſame obſervation is true, with reſpect to the tonſure of the antient monks. But the romaniſts have carried the affair of tonſure much farther; the candidate for it kneeling before the biſhop, who cuts his hair in five different parts of the head, *viz.* before, behind, on each ſide, and on the crown.

TOOL, among mechanics, denotes in general any ſmall inſtrument, uſed as well for making other more complex inſtruments and machines, as in moſt operations in the mechanic arts. See the article INSTRUMENT.

The tools of joiners, ſmiths, *&c.* may be ſeen delineated and deſcribed under the articles JOINERY, SMITHERY, *&c.*

TOOTH, *dens*, in anatomy, a little, very hard, and ſmooth bone, fixed in a proper alveolous or ſocket in the jaws, in the manner of a nail; and ſerving to maſticate or chew the food. See FOOD, CHYLE, and CHYLIFICATION.

The natural colour of the teeth, in mankind, is white; and their number from twenty-eight to thirty-two; fourteen, fifteen, or ſixteen being placed in each jaw, if the number be perfect. The teeth are uſually divided into the four inciſores, or fore-teeth; the two canine, eye-teeth, or dog-teeth; the eight molares, or grinders, in each jaw, and two dentes ſapientiæ.

The bodies of the teeth are compoſed of a double ſubſtance, a ſtony or porcelain-like matter, and a medullary one: their roots are ſometimes ſimple, as in the inciſores, canini, and foremoſt of the molares; and ſometimes double, triple, or quadruple, as in the hinder molares.

The cavities of the teeth are covered with a vaſculo-nervous membrane, and the foraminula, or little holes, in the ends of them, ſerve for the ingreſs of the veſſels which afford them nutrition and ſenſation.

The uſes of the teeth are to break our food, to aſſiſt us in ſpeaking, and to add to the beauty of the face.

For the breeding of the teeth, in infants, ſee the article DENTITION.

And as to the cleanſing of foul teeth, ſee the article DENTIFRICE.

TOOTH-ACH, *ὀδοντάλγια*, a very painful diſorder, cauſed by an impure ſerum which corrodes and rends the ligaments and nervo-glandulous coats, by which the teeth are kept firm in their ſockets: its ſeat may alſo be in the cavity or internal parts of the teeth themſelves.

The whole intention of cure, in this diſorder, conſiſts in deriving and diverting the impure ſcorbutic ſerum from the head, and then carrying it off by proper emunctories. This is to be done by ſaline, emollient, and purgative clyſters; by warm pediluvia of rain-water and wheat-bran, with venice-ſoap, uſed juſt before bed-time; by laxatives of manna and caſſia diſſolved in whey or aſſes-milk, or mineral waters: if the patient is plethoric or full of blood, phlebotomy in the foot will be proper, to derive the humours from the head. Sudoriſic remedies are alſo proper, but more eſpecially an electuary made of rob of elder-berries, burnt hart's-horn, diaphoretic antimony, and a few grains of nitre: or, an ounce of the rob may be taken in broth, to promote a diaphoreſis; and it may be uſed externally,

externally, diſſolved in beer, in the manner of a gargle, which will yield immediate relief to the patient.

When the patient is ſubject to catarrhs, is ſcorbutic or cachectic, then mineral waters are moſt proper; and if the patient is of a weak bilious conſtitution, the water ſhould be mixed with aſſes-milk. Outwardly may be applied bags, filled with paregoric and emollient ſpecies; ſuch as elder, melilot, and camomile-flowers, bay and juniper-berries, caraway and millet-ſeeds, and decrepitated ſalt: they muſt be laid on warm, and are very ſafe. A drop or two of oil of cloves or box, applied to a carious tooth with cotton, are medicines not to be deſpiſed; and camphorated ſpirits of wine, mixed with ſaffron, caſtor, and opium made into a liniment, and laid to the gums and hollow tooth, often gives the patient eaſe. When the tooth-ach proceeds from a rotten, hollow tooth, it will be beſt to burn the little nervous cord, which is the ſeat of the pain, with an acute cautery; and then the cavity may be filled up with a mixture of wax and maſtich. But if this cannot be done, the only remedy left is to have the tooth drawn.

Allen adviſes to rub the tooth, that is painful, with the root of the iris lutea, or the yellow fleur-de-luce; or a pill may be made of equal quantities of camphor or opium, and put into the hollow tooth; and, laſtly, ſome greatly recommend a ſmall plaſter of tacamahac, laid on the ſide of the face.

TOOTH-DRAWING, the operation of pulling out a carious, or otherwiſe injured tooth.

This art, according to Cicero, was invented by Æſculapius, in whoſe temple the antients hung up a pair of leaden pullicans, very properly ſignifying that no teeth were fit to be pulled out, but ſuch as might be removed with a leaden forceps; that is, ſuch as were looſe and ready to fall out of themſelves; for they very little conſult their own welfare, who pull out their teeth while firm and ſound: for drawing the teeth is not only a painful operation, but often brings on bad accidents, and ſometimes even hazards the patient's life.

Tooth-drawing, however wrong in many caſes, yet is certainly right and neceſſary in others. 1. In children, for the removing their lacteal or deciduous teeth; for when theſe are left too long in their ſockets, they diſplace the new ones, and turn them awry. 2. In infants it is alſo neceſſary to draw ſuch teeth as grow out of the palate, or out of improper parts of the mouth, and are placed ſo as to impede their ſpeaking or ſucking. 3. In the tooth-ach proceeding from a tooth's being carious, and giving way to no medicines, drawing is the laſt reſort, and is abſolutely neceſſary. 4. Thoſe teeth ought to be drawn which by their irregular figure and poſition lacerate the gums and lips, and cannot be brought into ſhape by the file. And, laſtly, it is ſometimes neceſſary to draw a tooth for the curing a fiſtula, or ulceration of the gums near the roots of the teeth.

The regular method of drawing them is this: if the tooth is in the lower jaw, the patient muſt be ſeated on a low ſeat, or on the floor, and if in the upper jaw, he muſt be placed on a high ſtool or table; then the proper inſtrument is to be ſelected, and the tooth carefully drawn as a nail out of a piece of wood. But this muſt never be done while the gums are inflamed, ſwelled, or otherwiſe diſtempered.

TOPARCHY, a little ſtate or ſeigniory, conſiſting only of a few cities or towns; or a petty country, governed and poſſeſſed by a toparch, or lord. See the article GOVERNMENT.

TOPAZ, in natural hiſtory, a gem called by the antients chryſolite, as being of a gold-golour. See the article GEM.

The topaz, when perfect and free from blemiſhes, is a very beautiful and valuable gem; it is, however, very rare in this ſtate. It is of the number of thoſe gems which are found only in the round or pebble form, there never having been yet ſeen a true and genuine topaz of a columnar figure, though the far greater part of what our jewellers call ſuch, are in that form. The greateſt part of the true topazes are no larger than grains of a coarſe ſeed; among theſe there are, however, ſome met with of the ſize of a pea, and ſome much larger, though thoſe are very rare. It is of a roundiſh or oblong figure in its native or rough ſtate, and uſually is flatted on one ſide, and is generally of a bright and naturally poliſhed ſurface, tolerably tranſparent. They are ever of a fine yellow colour; but they have this, like the other gems, in ſeveral different degrees; the fineſt of all are of a true and perfect gold-colour, but there are ſome much deeper, and others extremely pale, ſo as to appear ſcarce tinged. The ori-

ental topaz is equal to the ruby in hardneſs, and is ſecond only to the diamond in luſtre. The topazes of the other parts of the world fall off greatly from this hardneſs, but the pureſt of the genuine ones are conſiderably harder than cryſtal. The topaz, on being thrown into a charcoal fire, entirely loſes its colour, and when taken out, is a very fine colourleſs ſtone, undiſtinguiſhable from that known by the name of the white ſapphire: upon the whole it appears, that the oriental coloured gems are all much alike in their matter, differing ſcarce at all, except in colour, and that when they are found either naturally colourleſs, or rendered ſo by art, it is not eaſy to diſtinguiſh one of them from the other.

The fineſt topazes in the world are found in the Eaſt-Indies, but they are very rare there of any great ſize: the great mogul, however, at this time, poſſeſſes one, which is ſaid to weigh an hundred and fifty-ſeven carats, and to be worth more than twenty thouſand pounds. The topazes of Peru come next, after theſe, in beauty and in value; the european are principally found in Sileſia and Bohemia, and are generally full of cracks and flaws, and of a browniſh yellow.

Beſides all theſe degrees of value in the genuine topazes, our jewellers keep what they call a kind of them, inferior greatly to the true ones; all theſe are common hexangular cryſtals, coloured to a paler or deeper yellow in mines: theſe they cut into ſtones for rings, and ſell under the name of topazes; and moſt of the ſtones we ſee under that name are ſuch.

The antients have ſaid much of the topaz's virtue: it is ſaid to be a high cordial and ſudorific, and to have been given alſo in hæmorrhages with great ſucceſs. But whatever virtues it may poſſeſs, we are not to expect to find them in the ſtones our druggiſts now keep under the name of topazes, theſe being no other than fragments of a yellowiſh plated ſpar, common in lead mines, and impregnated more or leſs with that metal. The topaz itſelf ſeems to owe its colour to lead, but the quantity it contains of that is ſo very inconſiderable, that it can be of no effect in the body, and may very well be ſuppoſed to leave it in the ſtate of cryſtal; which ſeems as much as we are to imagine really of any of the gems; but this ſpar, ſold in the place of topaz, not only diſcovers that it holds a great deal of lead by its weight, but lead has actually been ſeparated from it, in no leſs quantity than one fifth of its weight.

TOPE, in ichthyology, the ſqualus with the noſtrils near the mouth, and ſmall holes near the eyes. See SQUALUS.

TOPHUS, in medicine, denotes a chalky or ſtony concretion in any part of the body, as the bladder, kidneys, &c. but eſpecially in the joints. See GOUT.

TOPIC, in rhetoric, denotes a probable argument, drawn from the ſeveral circumſtances of a fact, &c. Hence the art of finding and managing ſuch arguments, is called by the antients *topica*, τοπικα. See the article INVENTION.

TOPICS, or TOPICAL MEDICINES, are the ſame with external ones, or thoſe applied outwardly to ſome diſeaſed and painful part: ſuch are plaſters, cataplaſms, unguents, &c. See the articles PLASTER, &c.

TOPOGRAPHY, a deſcription or draught of ſome particular place, or ſmall tract of land, as that of a city or town, manor or tenement, field, garden, houſe, caſtle, or the like; ſuch as ſurveyors ſet out in their plots, or make draughts of, for the information and ſatisfaction of the proprietors.

TOPSHAM, a port-town of Devonſhire, ſituated on the river Ex, about four miles ſouth of Exeter.

TORBAY, a fine bay in the Engliſh channel, a little eaſt of Dartmouth, where the prince of Orange, afterwards king William III. landed, on Nov. 5, 1688.

TORBOLE, a town of the biſhopric of Trent, in Italy, fourteen miles ſouth-weſt of the city of Trent.

TORCELLA, a port-town of Catalonia, in Spain, ſituated at the mouth of the river Ter, in eaſt longit. 2° 50′, and north lat. 42°

TORCELLO, a town and iſland of Italy, ſeven miles north of the city of Venice.

TORCH, *tæda*, a luminary uſed in ſeveral church-ceremonies, funerals, &c. and more uſually called flambeau. See the articles FLAMBEAU and TAPER.

TORCH-THISTLE, *cereus*, or *cactus*, in botany. See the article CACTUS.

TORCULAR, in ſurgery, the ſame with the tournequet. See TOURNEQUET.

TORDESILLAS, a town of Spain, forty miles north-eaſt of Salamanca.

TORDYLIUM, in botany, a genus of umbelliferous plants, belonging to the *pentandria-digynia* claſs: the general flower of which is difform and radiated; the particular ones of the diſc conſiſt of five

five inflexo-cordated and equal petals; the fruit is roundiſh, compreſſed, and ſurrounded longitudinally with dentils; the ſeeds are two, roundiſh, and almoſt plane. This genus comprehends hedge-parſley, candy hart-wort, &c. the ſeeds of which laſt are accounted carminative, and alexipharmic, but are very little uſed in the preſent practice.

TORE, *torus*, in architecture, a large round moulding, uſed in the baſes of columns. See the article MOULDING.

TOREUMATOGRAPHY, a greek term, ſignifying the knowledge or rather deſcription of antient ſculptures and baſſo-relievos.

TOREUTICE, τορευτικη, that part of ſculpture otherwiſe called turning. See the article TURNING.

TORGAW, a town of the dutchy of Saxony, ſituated on the river Elbe, thirty-five miles north-weſt of Dreſden.

TORIES, or TORYS, in the hiſtory of England, a faction or party, oppoſed to the whigs. See the article WHIGS.

The tories are great ſticklers for the prerogative of the crown, as the whigs are for the liberties and privileges of the people: though, in truth, the principles of the moderate people of both parties do not greatly differ.

TORMENTIL, *tormentilla*, in botany, a genus of the *icoſandria-pentagynia* claſs of plants, with a roſaceous flower, conſiſting of four obverſely cordated, plane, and patent petals; the ſtamina are ſixteen ſubulated filaments, about half the length of the cup; the ſeeds are eight in number, oblong, obtuſely acuminated, and contained in the cup, which forms a kind of globoſe capſule.

Tormentil-root has an auſtere ſtyptic taſte, accompanied with an aromatic flavour: it is one of the moſt agreeable and efficacious vegetable aſtringents: there are alſo a tincture and a diſtilled water of it, the former of which poſſeſſes all the virtues of the ſimple.

TORMES, a river of Spain, which runs from ſouth-eaſt to north-weſt, through the province of Leon, paſſes by Salamanca, and afterwards falls into the river Douro in Portugal.

TORMINA, GRIPES, in medicine. See the article COLIC.

TORNADO, or TURNADO, a ſudden and vehement guſt of wind from all points of the compaſs, frequent on the coaſt of Guinea. See the articles HURRICANE, WHIRLWIND, &c.

TORNAW, a town of upper Hungary, ſixty miles north-eaſt of Buda.

TORNE, or TORNEA, the capital of Torne-Lapmark, a province of Sweden, ſituated at the mouth of the river Torne, at the bottom of the Bothnic gulph, upon a little iſland made by the river, four hundred miles north of Stockholm: eaſt lon. 22° 45′, north lat. 65° 45′.

TORNESOL, or TURNESOL. See the article TURNESOL.

TORO, a city of Leon, in Spain, ſituated on the river Douro, thirty-five miles weſt of Valladolid.

TORPEDO, the CRAMP or NUMB-FISH, in ichthyology, a ſpecies of raia, the body of which is perfectly ſmooth, and conſiderably broad in proportion to its length; the roſtrum or ſnout is oblong and ſubacute; the back is ſomewhat gibboſe; the belly is flat, and the ſides are terminated by broad fins; its colour on the back is a duſky greyiſh, and the belly is white. See the article RAIA.

The moſt ſingular property of this fiſh is, that, when out of the water, it affects the hand or other part that touches it, with a ſenſation much like that which we call the cramp; the ſhock is inſtantaneous, and reſembles that given by electricity, only that the effect laſts longer: this is all the fiſh can do; but thoſe who have related it, have raiſed the effects almoſt into miracles. Reaumur has given a long memoir, wherein he endeavours to account for this ſingular phænomenon, which he reſolves into the inſtantaneous action of a vaſt multitude of ſmall muſcles on the ſurface of the body of the fiſh: but there ſeems ſomething more required, in order to the perfectly explaining ſo odd an effect. See plate CCLXXIX. fig. 4.

TORQUATA, in zoology, a name given to the natrix, or water-ſnake, from the remarkable ring it has about its neck. See the article NATRIX.

TORQUE, in heraldry, denotes a round roll of cloth, twiſted and ſtuffed: ſuch is the bandage, frequently ſeen in armories, about the heads of Moors, &c. It is always of the two principal colours of the coat; and is accounted the leaſt honourable decoration worn on the helmet, by way of creſt.

TORREFACTION, in chemiſtry, is the roaſting or ſcorching of a body by the fire, in order to diſcharge a part either unneceſſary or hurtful in another operation; as ſulphur is thus diſcharged from

an

an ore, before the metal can be obtained to advantage. See ROASTING.

TORREJO, a town of New Caſtile, in Spain, fifteen miles ſouth of Madrid.

TORRENT, *torrens*, in geography, denotes a temporary ſtream of water, falling ſuddenly from mountains, whereon there have been great rains, or an extraordinary thaw of ſnow.

TORRES, a port-town of Granada, in Spain, forty-five miles ſouth-weſt of the city of Granada: weſt lon. 4° 26′, north lat. 36° 45′.

TORRICELLIAN EXPERIMENT, a famous experiment made by Torricelli, a diſciple of the great Galileo, which has been already explained under BAROMETER.

TORRID ZONE, among geographers, denotes that tract of the earth lying upon the equator, and on each ſide as far as the two tropics, or 23° 30′ of north and ſouth lat. The torrid zone was believed, by the antients, to be uninhabitable; but is now well known to be not only inhabited by the natives of thoſe hot climates, but even tolerable to the people of the colder climates, towards the north and ſouth; the exceſſive heat of the day being there tempered by the coldneſs of the night. See the article HEAT.

TORRIGLIA, a town of the territory of Genoa, in Italy, ſituated ten miles north-weſt of Genoa.

TORRINGTON, a market-town of Devonſhire, ſituated on the river Towbridge, twenty-ſix miles north-weſt of Exeter.

TORROCK, in ornithology, the larus with a white head, and a black ſpot on each ſide. See the article LARUS.

TORSIL, a town of Sweden, in the province of Sunderland, ſituated on the Mellerlake, forty-three miles weſt of Stockholm.

TORT, in law, a french term, ſignifying wrong or injury.

TORTOISE, *teſtudo*, in zoology. See the article TESTUDO.

TORTONA, a city of Italy, in the dutchy of Milan, ſituated on the ſouth ſide of the Po, thirty-two miles ſouth-weſt of Milan.

TORTOSA, a city of Catalonia in Spain, ſituated on the river Ebro, ninety miles ſouth weſt of Barcelona: eaſt long. 15′, and north lat. 40° 45′.

TORTUGA, an iſland of the Weſt-indies, near the north coaſt of Hiſpaniola.

TORTUGA is alſo an iſland on the coaſt of Terra Firma.

TORTURE, a grievous pain inflicted on a criminal, or perſon accuſed, to make him confeſs the truth.

TOSA, a port-town of Catalonia, in Spain, thirty-ſeven miles north-eaſt of Barcelona.

TOSCANELLA, a town of Italy, thirty-five miles north of Rome.

TOTANUS, or GODWIT, in ornithology, the red-legged tringa, with a black beak, red at the baſe. See TRINGA.

TOTNESS, a borough-town of Devonſhire, twenty-three miles ſouth-weſt of Exeter. It ſends two members to parliament.

TOTTED. A good debt to the king is, by the foreign appoſer, or other officer of the exchequer, noted for ſuch by writing the word *tot*, *q. d. tot pecuniæ regi debentur*; whence it is ſaid to be totted. Alſo that which is paid is to be totted.

TOUCAN, in ornithology, a ſpecies of ramphaſtos, of a middle ſize between our common magpie and the thruſh, but having a beak thicker and longer than its whole body: this beak is hooked at the end, and is of a very thin ſubſtance, not exceeding the thickneſs of a membrane, and very light and hollow, yet bony in ſubſtance, and very bright and ſhining. It has a ſort of toothed edge, which prevents its ſhutting cloſely, and, giving paſſage for the air, enables the bird to live without noſtrils. It is yellowiſh on the outſide and red within, and is covered with a ſort of ſcaly ſubſtance, eaſily ſcraped off with a finger at the edge.

The head of this bird is large in proportion to its body, and is black on the crown; the reſt of it, and the neck and back, are ſlightly variegated with white; its breaſt is of a bright orange-colour, its belly and thighs of a very fine and bright red, and the tail is black but red at the end. See plate CCLXXXI. fig. 3.

TOUCAN, in aſtronomy, a conſtellation of the ſouthern hemiſphere, conſiſting of eight ſmall ſtars, and otherwiſe called anſer americanus.

TOUCH-NEEDLE, among aſſayers, refiners, *&c.* little bars of gold, ſilver, and copper, combined together in all the different proportions and degrees of mixture; the uſe of which is to diſcover the degree of purity of any piece of gold or ſilver, by comparing the mark it leaves on the touch-ſtone, with thoſe of the bars.

The metals uſually tried by the touch-ſtone, are gold, ſilver, and copper, either pure, or mixed with one another in different degrees and proportions, by fuſion. In order to find out the purity or quantity of baſer metal in theſe various admixtures, when they are to be examin-

ed, they are compared with these needles, which are mixed in a known proportion, and prepared for this use. The metals of these needles, both pure and mixed, are all made into laminæ or plates, one twelfth of an inch broad, and of a fourth part of their breadth in thickness, and an inch and half long; these being thus prepared, you are to engrave on each a mark indicating its purity, or the nature and quantity of the admixture in it.

The black rough marbles, the basaltes, or the softer kinds of black pebbles, are the most proper for touch-stones. See MARBLE, BASALTES, &c.

Now the method of using the needles and stone is this: the piece of metal to be tried, ought first to be wiped well with a clean towel, or piece of soft leather, that you may the better see its true colour; for from this alone an experienced person will, in some degree, judge before-hand what the principal metal is, and how, and with what debased.

Then chuse a convenient not over large part of the surface of the metal, and rub it several times very hardly and strongly against the touch-stone, that in case a deceitful coat or crust should have been laid upon it, it may be worn off by that friction: this, however, is more readily done by a grind-stone, or small file, if you have them at hand. Then wipe a flat and very clean part of the touchstone, and rub against it, over and over, the just mentioned part of the surface of the piece of metal, till you have, on the flat surface of the stone, a thin metallic crust, an inch long, and about an eighth of an inch broad: this done, look out the needle that seems most like to the metal under trial, wipe the lower part of this needle very clean, and then rub it against the touch-stone, as you did the metal, by the side of the other line, and in a direction parallel to it. When this is done, if you find no difference between the colours of the two marks, made by your needle and the metal under trial, you may with great probability pronounce that metal and your needle to be of the same alloy, which is immediately known by the mark engraved on your needle. But if you find a difference between the colour of the mark given by the metal, and that by the needle you have tried, choose out another needle, either of a darker or lighter colour than the former, as the difference of the tinge on the touch-stone directs; and by one or more trials of this kind you will be able to determine which of your needles the metal answers, and thence what alloy it is of, by the mark of the needle; or else you will find that the alloy is extraordinary, and not to be determined by the comparison of your needles.

TOUL, a city of Lorrain, twelve miles west of Nancy.

TOULON. } See { THOULON.
TOULOSE. } { THOULOSE.

TOUR, a french term, frequently used for a journey or progress through one or more countries.

TOURN, or TURN, in law. See the article TURN.

TOURNAMENT, or TURNAMENT. See the article TURNAMENT.

TOURINE, a town of the bishopric of Liege, thirteen miles north-east of Namur.

TOURNAY, a city of Flanders, in the austrian Netherlands, situated on the river Scheld, thirteen miles east of Lisle: east lon. 3° 30′, and north lat. 50° 37′.

TOURNEFORTIA, in botany, a genus of the *pentandria-monogynia* class of plants, the flower of which consists of a single petal, in form of an oval tube, longer than the calyx, divided into five slight segments somewhat broad and pointed, and spread open; the fruit is a globose berry, containing two cells; and the seeds are of an oval figure, two in number, and separated by the pulp.

TOURNEQUET, in surgery, an instrument made of rollers, compresses, screws, &c. for compressing any wounded part, so as to stop hæmorrhages. See the article HÆMORRHAGE.

The common tournequet is very simple, consisting only of a roller, which, with the help of a small stick, serves to stop the effusion of blood from large arteries, in amputations, by forcibly tying up the limb. The things necessary for this are a roller, of a thumb's breadth, and of an ell in length, a small cylindrical stick, a conglomerated bandage, two fingers thick and four long, some compresses of a good length and about three or four fingers breadth, to surround the legs and arms, and a square piece of strong paper or leather, about four fingers wide. See plate CCLXXX. fig. 1.

The manner of applying this instrument is this; the rolled bandage is to be applied to the trunk of the wounded artery length-ways, covering it, in a contrary direction, with compresses surrounding the

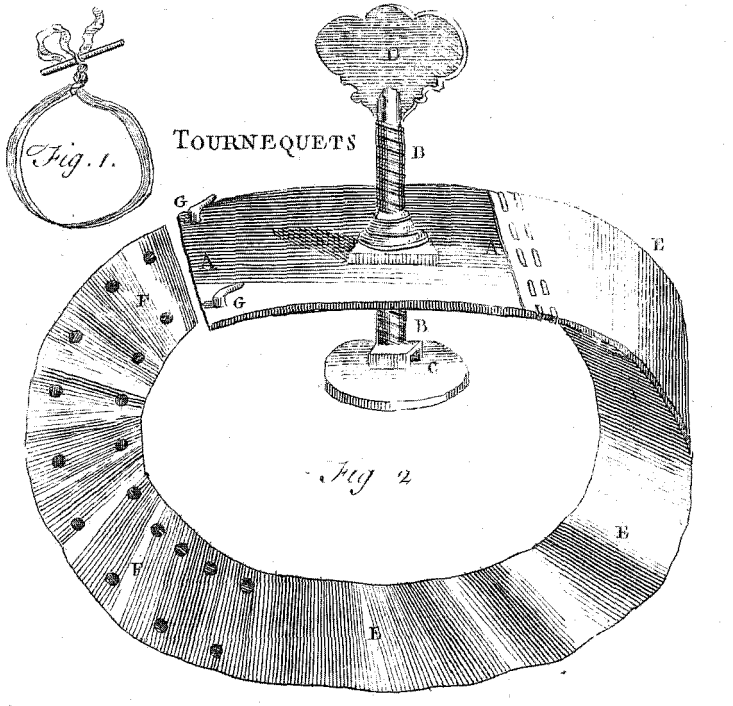


Fig. 1.
TOURNEQUETS
D
B
G
A
G
F
E
B
C
Fig 2
E
F
E

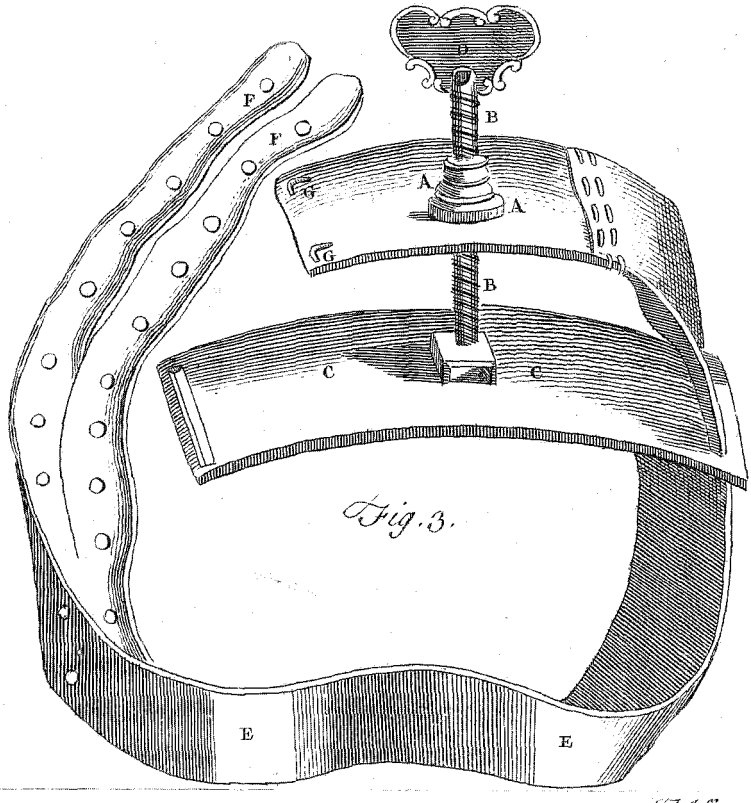

D
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Fig. 3.
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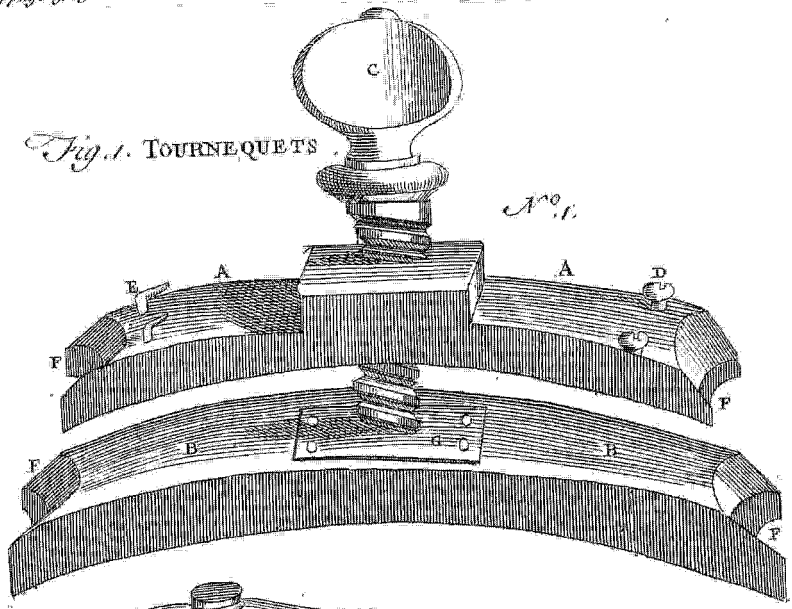
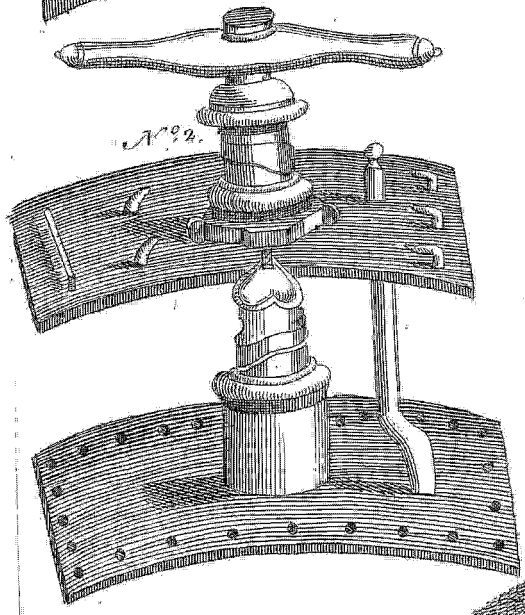
Fig. 1. TOURNEQUETS

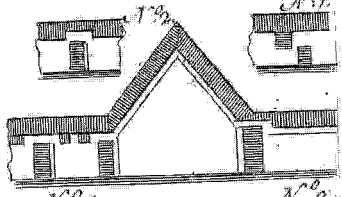


N°. 1.



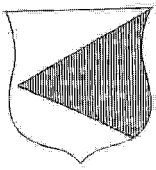
N°. 2.

Fig. 2 TRAVERSES



N°. 4. N°. 3.

Fig. 4. TRAVERSE



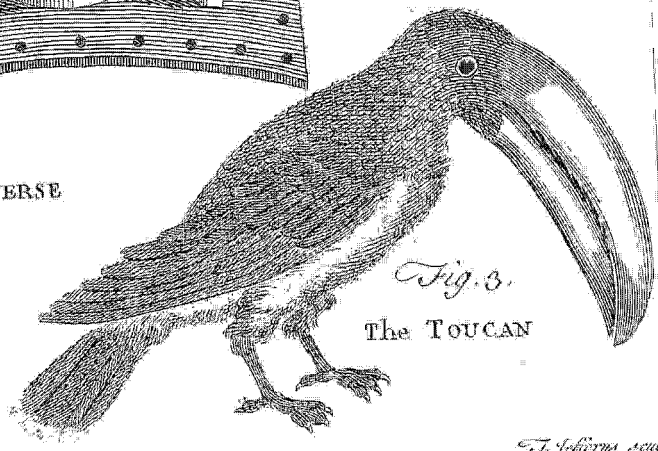


Fig. 3.
The TOUCAN

T. Jefferys sculp.

the foot, leg, or arm, as it were with a ring; the roller muſt be paſſed twice round theſe applications, and faſtened in a knot, but ſo looſely that you may eaſily introduce your hand between it and the part: the leather or thick paper muſt now be nicely placed under it, upon the external part of the leg, and the roller tightened by degrees, by turning round the ſtick, which is to be introduced into the knot; this to be done till the hæmorrhage is entirely ſtopped: the ſtick muſt now be kept in this ſituation till the wound is properly treated, and the return of the hæmorrhage is prevented. When this end is acquired, the tournequet is to be looſened, or entirely taken off, as ſhall be judged moſt convenient; but where it is applied to the arm, the rolled bandage is to be placed near the axilla, in the internal part of the humerus, and the ſtick in this caſe is to be faſtened on the oppoſite ſide, the ſituation of the artery there requiring this poſition: and when it is to be applied to the thighs, the bandage is to be put as the caſe ſhall require, either to the upper part of the thigh, or juſt over the knee.

But beſides the common tournequet, there are other more complex forms of this inſtrument. *Ibid.* fig. 2. is a braſs-tournequet, for ſtopping the hæmorrhages in wounds of large arteries; where AA is a braſs-plate, ſomewhat bent; BB, a ſtrong braſs-ſcrew; C, a round plate, to be fixed upon the wound; D, the button which turns the ſcrew; EE, a ſtrong leather-belt, to ſurround the wounded part; FF, part of the belt pierced with holes, whereby it may be fixed upon the belt GG, and lengthened and ſhortened according to the ſize of the limb.

Ibid. fig. 3. is another braſs-tournequet, after Petit's manner, the uſe and application of which will be eaſily underſtood from the deſcription of fig. 2.

In plate CCLXXXI. fig. 1. n° 1. is delineated a wooden tournequet, where AA is the upper part; BB, the lower part; C, the ſcrew; D, the two ſmall iron-ſcrews, to which a leather or ſilk-belt is to be fixed; E, hooks, on which to faſten the other end of the belt; FF, the ends of the upper and lower parts of the inſtrument, hollowed to receive the belt, and keep it ſteady in its ſituation.

Ibid. n° 2. is another kind of tournequet, made of iron, the parts and uſes of which will be eaſily conceived from what has been already ſaid.

TOURNON, a town of Languedoc, in France, fifty miles ſouth of Lyons.

TOURS, a city of France, ſixty miles ſouth-weſt of Orleans.

TOWAGE, the hawling or drawing of a ſhip, barge, &c. by men or beaſts, or by another ſhip or boat, faſtened to her, in order to make her enter a port, aſcend a river, &c.

TOWER, *turris*, a tall building, conſiſting of ſeveral ſtories, uſually of a round form, though ſometimes ſquare or polygonal.

Towers are built for fortreſſes, priſons, &c. as the Tower of London, the Tower of the Baſtile, &c.

The Tower of London is not only a citadel, to defend and command the city, river, &c. but alſo a royal palace, where our kings, with their courts, have ſometimes lodged; a royal arſenal, wherein are arms and ammunition for ſixty thouſand ſoldiers; a treaſury for the jewels and ornaments of the crown; a mint for coining of money; the great archive, wherein are preſerved all the antient records of the courts of Weſtminſter, &c. and the chief priſon for ſtate criminals.

TOWN, a place inhabited by a conſiderable number of people, being of a middle ſize between a city and village.

Hanſe-TOWNS. See HANSE.

TOXICODENDRON, the POISON-WOOD, in botany, a ſpecies of rhus, or ſumach, with a ſmooth and ſtriated berry, containing a ſulcated and compreſſed nucleus. See the article SUMACH.

Poiſon-wood is ſaid to poiſon two ways, by handling of it, and by the ſmell. The ſcent of it, when cut down in the woods, has poiſoned many people, and many more have ſuffered by it while burning in their fires. People with only handling it have been made blind for ſeveral days; and perſons who ſit near a fire when it is burning, are often ſwelled and choaked up in all parts of the body, in a terrible manner.

TOXICUM, POISON. See POISON.

TOZZIA, in botany, a genus of the *didynamia-angioſpermia* claſs of plants, with a monopetalous ringent flower; the upper lip of which is bifid, and the lower one trifid; the fruit is a globoſe unilocular capſule, containing an ovated ſeed.

TRABEATION, in the antient architecture, the ſame with entablature. See the article ENTABLATURE.

TRACES *of the brain*, among the carteſians, denotes the impreſſions which ſen-

ſible objects make on the fine fibres of the brain, by means of the organs of ſenſe; on which impreſſions memory, imagination, &c. are ſuppoſed, in a great meaſure, to depend. See MEMORY, &c.

TRACHEA, in anatomy, called alſo aſpera arteria, and in engliſh the windpipe, is a tube, or canal, extended from the mouth to the lungs; its ſituation is in the middle and anterior part of the neck; and it is connected with the fauces, the lungs, and the œſophagus. Anatomiſts commonly divide it into two parts, the larynx, and aſpera arteria properly ſo called. See the article LARYNX.

The trachea, or aſpera arteria properly ſo called, is that whole cartilaginous canal, extended from the larynx, which is only its mouth or entrance, to the bronchia or lungs; being, in ſome meaſure, of a conic figure. Its beginning is cylindrical, and capable of admitting a finger; and its other end is ſomewhat narrower. It enters the thorax under the ſternum, and is there divided into two branches, before it enters the lungs: it is compoſed of eighteen or nineteen, ſometimes but ſixteen, ſometimes twenty, cartilaginous rings, and four coats. Theſe rings are imperfect, the hinder part of the trachea being membranaceous. Of the four coats, the exterior is membranaceous, the ſecond glandulous, the third muſcular, and the fourth or internal covering is tendinous and robuſt.

The uſes of the trachea are, to aſſiſt in diglutition, and to be aſſiſtant to the lungs: on the exterior part of it are the thyroide and bronchial glands, which ſecrete an humour to moiſten it: its arteries are from the external carotids, the veins from the jugulars, and the nerves from the recurrent ones of the plexus cervicalis. See the article GLAND, ARTERY, VEIN, &c.

The tracheæ of vegetables are certain air-veſſels, diſcernible in many plants, but in none more diſtinctly than in the melon.

TRACHELIUM, in botany, a genus of the *pentandria-monogynia* claſs of plants, with a funnel-faſhioned flower, divided into five ſegments at the limb; the fruit is a roundiſh obtuſely trilobous capſule, containing a great number of very minute ſeeds.

TRACHENBERG, a town of Sileſia, twenty-five miles north of Breſlaw.

TRACHINUS, in ichthyology, a genus of the acanthopterygeous fiſhes, the operacula of whoſe gills are pointed, and the eyes placed near one another, in the upper part of the head; there are two back-fins, and the firſt very ſhort.

To this genus belong the draco and uranoſcopus. See the article DRACO and URANOSCOPUS.

TRACT, in geography, an extent of ground, or a portion of the earth's ſurface.

TRACT, in matters of literature, denotes a ſmall treatiſe, or written diſcourſe, upon any ſubject.

TRACTION, the act of drawing, whereby a thing is brought nearer to the mover.

TRACTRIX, in geometry, a curve otherwiſe called catenaria. See the article CATENARIA.

TRADE, in general, denotes the ſame with commerce, conſiſting in buying, ſelling, and exchanging of commodities, bills, money, &c. See COMMERCE, COIN, MONEY, COMPANY, &c.

TRADE-WINDS, denote certain regular winds at ſea, blowing either conſtantly the ſame way, or alternately this way and that; thus called from their uſe in navigation, and the indian commerce.

The trade winds are of different kinds, ſome blowing three or ſix months of the year one way, and then the like ſpace of time the oppoſite way; theſe are very common in the indian ſeas, and are called monſoons. See the article MONSOON.

Others blow conſtantly the ſame way; ſuch is that general wind between the tropics, which, off at ſea, is found to blow all day long from eaſt to weſt. For the phænomena of each, with their phyſical cauſes, ſee the article WIND.

TRADESCANTIA, in botany, a genus of the *hexandria-monogynia* claſs of plants, the flower of which conſiſts of three orbiculated, plane, and very patent petals; and its fruit is an oval trilocular capſule, containing a few angulated ſeeds.

TRADITION, among eccleſiaſtical writers, denotes certain regulations regarding the rites, ceremonies, &c. of religion, which we ſuppoſe to have been handed down from the days of the apoſtles, to the preſent time.

Tradition is diſtinguiſhed into written, whereof there are are ſome traces in the writings of the antient fathers; and unwritten, whereof no mention is made in the writers of the firſt ages of chriſtianity.

TRAERBACH

TRAERBACH, a town of Germany, ſituated on the Moſelle, twenty miles north-eaſt of Triers.

TRAFFIC. See the articles TRADE and COMMERCE.

TRAGACANTH, *tragacantha*, in botany, a genus of the *diadelphia-decandria* claſs of plants, with a papilinaceous flower; its fruit is a ſhort bilocular pod, of a roundiſh figure, and containing a few kidney-ſhaped ſeeds.

Gum-tragacanth, or, as ſome call it, gum-adragant, or gum-dragon, is the produce of this ſhrub, which grows to about four feet high, and has a firm and robuſt ſtem, with numerous branches. The gum is brought to us in long and ſlender pieces, of a flatted figure, more or leſs, and theſe not ſtrait, or rarely ſo; but commonly twiſted and contorted various ways, ſo as to reſemble worms. We ſometimes meet with it like the other vegetable exſudations, in roundiſh drops, but theſe are much more rare. It is moderately heavy, of a firm conſiſtence, and, properly ſpeaking, very tough rather than hard, and is extremely difficult to powder, unleſs firſt careſully dried, and the mortar and peſtle kept warm. Its natural colour is a pale whitiſh, and in the cleaneſt pieces it is ſomething tranſparent. It is often, however, met with tinged browniſh, and of other colours, and more opake. It has no ſmell, and very little taſte, but what it has is diſagreeable. Taken into the mouth, it does not grow clammy, and ſtick to the teeth, as the gum-arabic does, but melts into a kind of very ſoft mucilage. It diſſolves in water but ſlowly, and communicates its mucilaginous quality to a great quantity of that fluid. It is by no means ſoluble in oily or ſpirituous liquors, nor is it inflammable. It is brought to us from the iſland of Crete, and from ſeveral parts of Aſia. It is to be choſen in long twiſted pieces, of a whitiſh colour, very clear, and free from all other colours; the brown, and particularly the black, are wholly to be rejected.

Tragacanth has the ſame virtues with gum-arabic, but in a greater degree. It greatly inſpiſſates and obtunds the acrimony of the humours, and is therefore found of vaſt ſervice in inveterate coughs, and other diſorders of the breaſt, ariſing from an acrid phlegm, and in ſtranguries, heat of urine, and all other complaints of that kind. It is uſually given in the compound powder, called the ſpecies diatragacanthi frigidæ, rarely alone. It is alſo, by ſome, eſteemed a very great external remedy for wounds, and in this ſenſe made an ingredient in ſome ſympathetic powders, with vitriol and other things. It is by ſome recommended alone, in form of a powder or ſtrong mucilage, for cracks and chaps in the nipples of women: but it is found, by experience, to be a very troubleſome application in thoſe caſes, and to do more harm than good, as it dries by the heat of the part, and draws the lips of the wound farther aſunder than before.

TRAGEA, in pharmacy, an aromatic powder, groſly beaten and mixed with ſugar, taken by way of carminative.

TRAGEDY, a dramatic poem, repreſenting ſome ſignal action performed by illuſtrious perſons, and which has frequently a fatal iſſue, or end. See DRAMA.

Ariſtotle, more ſcientifically, defines tragedy, the imitation of one grave and entire action, of a juſt length, and which, without the aſſiſtance of narration, by raiſing of terror and compaſſion, refines and purges our paſſions. This definition has given the critics ſome perplexity; and Corneille declares he cannot reconcile Ariſtotle with himſelf: the inſtances Ariſtotle cites, he thinks, ruin his own definition; he even denies the purging our paſſions to be the end of tragedy. Our engliſh authors are more favourable to the definition by the purging our paſſions; they underſtand not the extirpating them, but the reducing them to juſt bounds; for by ſhewing the miſeries that attend a ſubjection to them, it teaches us to watch them more narrowly; and by ſeeing the great misfortunes of others, it leſſens the ſenſe of our own.

Tragedy, in its original, M. Hedelin obſerves, was only a hymn ſung in honour of Bacchus, by ſeveral perſons, who, together, made a chorus of muſic, with dances and inſtruments. As this was long, and might fatigue the ſingers, as well as tire the audience, they bethought themſelves to divide the ſinging of the chorus into ſeveral parts, and to have certain recitations in the intervals. Accordingly Theſpis firſt introduced a perſon upon the ſtage with this view. Æſchylus, finding one perſon inſufficient, introduced a ſecond, to entertain the audience more agreeably, by a kind of dialogue: he alſo cloathed his perſons more decently, and firſt put them on the buſkin. See HYMN, CHORUS, BUSKIN, &c.

The

The perſons who made theſe recitations on the ſcene, were called actors; ſo that tragedy was at firſt without actors. And what they thus rehearſed, being things added to the ſinging of the chorus, whereof they were no neceſſary part, were called epiſodes. See the article EPISODE.

Sophocles found that two perſons were not enough for the variety of incidents, and accordingly introduced a third: and here the Greeks ſeem to have ſtopped; at leaſt, it is very rare that they introduced four ſpeakers in the ſame ſcene.

Tragedy and comedy were, at firſt, confounded with each other, but were afterwards ſeparated; and the poets applied themſelves to the cultivating of tragedy, neglecting comedy. See COMEDY.

When tragedy was got into a better form, they changed the meaſure of its verſe, and endeavoured to bring the action within the compaſs of a day, or of a revolution of the ſun. See the article UNITY.

For the ſeveral parts of tragedy, ſee the articles ACT, SCENE, ACTION, FABLE, CHARACTERS, MANNERS, *&c.*

The Engliſh received the firſt plan of their drama from the French, among whom it had its riſe towards the end of Charles V. under the title of chant-royal, which conſiſted of pieces in verſe, compoſed in honour of the Virgin, or ſome of the ſaints, and ſung on the ſtage: they were called by the title of chant-royal, becauſe the ſubject was given by the king of the year, or the perſon who had borne away the prize the year preceding.

The humour of theſe pieces ran wonderfully among the people, inſomuch that in a little time there were formed ſeveral ſocieties, who began to vie with each other: one of theſe, to engage the town from the reſt, began to intermix various incidents or epiſodes, which they diſtributed into acts, ſcenes, and as many different perſons as were neceſſary for the repreſentation. Their firſt eſſay was in the Bourg St. Maur, and their ſubject the paſſion of our Saviour. The provoſt of Paris prohibiting their continuing it, they made application to court; and to render it the more favourable to them, elected themſelves into a friary or fraternity, under the title of brothers of the paſſion: which title has given ſome occaſion to ſuſpect them to have been an order of religious.

The king, on ſeeing and approving ſome of their pieces, granted them letters of eſtabliſhment, in 1402; upon which they built a theatre, and for an age and a half acted none but grave pieces, which they called moralities; till, the people growing weary of them, they began to intermix farces, or interludes, from prophane ſubjects.

This mixture of farce and religion diſpleaſing many, they were re-eſtabliſhed by an arret of parliament, in 1548, on condition of their acting none but proper, lawful, and decent ſubjects, without intermeddling with any of the myſteries of religion; and thus were the brothers of the paſſion deſpoiled of their religious character: upon which they mounted the ſtage no more in perſon, but brought up a new ſet of comedians, who acted under their direction.

Thus was the drama eſtabliſhed, and on this foundation arrived in England. In proceſs of time, as it was improved, it became divided into two branches, agreeable to the practice of the antients, and the nature of things, *viz.* into tragedy and comedy, properly ſo called; and this laſt again was ſubdivided into pure comedy and farce. See COMEDY and FARCE.

TRAGI-COMEDY, a dramatic piece partaking of the nature both of tragedy and comedy, the event whereof is not bloody or unhappy, and wherein is admitted a mixture of leſs ſerious characters.

The foundation of tragi-comedy is certainly bad; for endeavouring to make us laugh and cry by turns, it endeavours at contrary motions, which the heart can never undergo; every thing that diſpoſes for the one, indiſpoſing for the other: for which reaſon it is at preſent, with great juſtice, diſuſed. However, tragi-comedy is the only way wherein comedy is allowed to introduce kings and heroes.

TRAGIA, in botany, a genus of the *monoecia-tetrandria* claſs of plants, without any flower-petals; its fruit is a very large tricoccous capſule, of a roundiſh figure, containing ſingle and roundiſh ſeeds.

TRAGOPOGON, GOAT'S BEARD, in botany, a genus of the *ſyngeneſia-polygamia* claſs of plants, the compound flower of which is imbricated and uniform, being compoſed of a multitude of ligulated ſemi-floſcules, quinquedentated at the ends, and ſtanding on the embryo-ſeeds, which are enveloped in a covering, and winged with down.

TRAGOSELINUM, in botany, Tournefort's name for the pimpinella of Linnæus, a plant of the *pentandria-digynia* claſs; the

the general corolla of which is uniform, and the partial one conſiſts of five inflexo-cordated, and almoſt equal petals: there is no pericarpium, the fruit is ovato-oblong, and ſeparable in two parts; the ſeeds are two, of an ovato-oblong figure, narrower towards the apex convex, and ſtriated on one ſide, and plane on the other.

TRAGUS, τραγος, in anatomy, one of the protuberances of the auricle, or external ear, called alſo hircus, becauſe uſually hairy. The tragus is that protuberance next the temple: that on the oppoſite ſide, to which the ſoft lobe of the ear is annexed, is called the antitragus. See EAR.

TRAJAN COLUMN, a famous hiſtorical column erected in Rome, in honour of the emperor Trajan. It is of the tuſcan order, though ſomething irregular; its height is eight diameters, and its pedeſtal corinthian: it was built in a large ſquare there, called Forum Romanum. Its baſe conſiſts of twelve ſtones, of an enormous ſize, and it is raiſed on a ſocle, or foot of eight ſteps; within ſide is a ſtair-caſe, illuminated with fourty-four windows. It is 140 feet high, which is thirty-five ſhort of the antonine column, but the workmanſhip of the former is much more valued. It is adorned from top to bottom with baſſo relievo's, repreſenting the great actions of that emperor againſt the Dacæ.

TRAJECTORY *of a comet*, is its path or orbit, or the line it deſcribes in its motion. See the article COMET.

TRAIL BOARD, in a ſhip, a carved board on each ſide of her beak, which reaches from the main ſtem to the figure, or the brackets.

TRAIN, the attendance of a great perſon, or the trail of a gown, or robe of ſtate. In falconry, it denotes the tail of an hawk

TRAIN, is likewiſe uſed for the number of beats which a watch makes in an hour, or any other certain time.

TRAIN, is alſo uſed for a line of gunpowder, laid to give fire to a quantity thereof, in order to do execution by blowing up earth, works, buildings, &c.

TRAIN, or TRAILE OF ARTILLERY, includes the great guns, and other pieces of ordnance belonging to an army in the field. See the article CANNON.

TRAIN-OIL, the oil procured from the blubber of a whale by boiling. See the articles OIL and WHALE.

TRAIN-BANDS, or TRAINED-BANDS, a name given to the militia of England. See the article MILITIA.

TRAINING, or TRACING, in mineralogy, a term uſed by the miners, to expreſs the tracing up the mineral appearances on the ſurface of the earth to their head, or original place, and their finding a mine of the metal they contain. See MINE.

TRAITOR, or TRAYTOR, a perſon guilty of treaſon. See TREASON.

TRALOS-MONTES, a province of Portugal, bounded by Spain on the north-eaſt; by the province of Beira on the ſouth; and by Entreminho Douro on the weſt.

TRAMBLING *of tin ore*, among miners, the waſhing it very clean, which is done in a ſhovel, and in a frame of boards. See the article TIN.

TRAMEL, an inſtrument, or device, ſometimes of leather, more uſually of rope, fitted to a horſe's legs, to regulate his motions, and form him to an amble. It is alſo taken in many places for an iron moveable inſtrument in chimnies to hang pots over the fire.

TRAMEL-NET, is a long net wherewith to take fowl by night in champain countries, much like the net uſed for the low bell, both in ſhape, bigneſs, and maſhes. To uſe it, they ſpread it on the ground, ſo as the nether or farther end fitted with ſmall plumbets, may lie looſe thereon; then the other part being borne up by men placed at the fore ends, it is thus trailed along the ground. At each ſide are carried great blazing lights, by which the birds are raiſed, and as they riſe under the net they are taken.

TRAMONTANE, or TRAMONTAIN, ſomething beyond, or on the farther ſide the mountains, applied particularly by the Italians, to ſuch as live on the other ſide the Alps, *i. e.* all out of Italy, as the Germans, Flemiſh, French, &c.

TRANGLE, in heraldry, the diminutive of a feſs, commonly called a bar. See the article FESS and BAR.

TRANI, a port-town of Italy, in the kingdom of Naples, and territory of Barri, ſituated on the gulph of Venice, twenty miles weſt of Barri.

TRANSACTION, *tranſactio*, in the civil law, an accommodation of ſome buſineſs, or diſpute between two parties, by a mutual and voluntary agreement between them. See ACCOMMODATION.

Philoſophical TRANSACTIONS, a kind of journal of the principal things that come before the Royal Society of London. See the article SOCIETY.

It appears, that the printing of these tranſactions was always, from time to time, the ſingle act of the reſpective ſecretaries of the ſociety, till the publication of the 47th volume, in 1753, notwithſtanding it has been the common opinion, that they were publiſhed by the authority and under the direction of the ſociety itſelf. The truth is, that the ſociety, as a body, never did intereſt themſelves further in their publication, than by occaſionally recommending the revival of them to ſome of their ſecretaries, when, from the particular circumſtances of their affairs, the tranſactions had happened for any length of time to be intermitted, and this ſeems principally to have been done with a view to ſatisfy the public, that their uſual meetings were then continued for the improvement of knowledge and benefit of mankind, the great ends of their firſt inſtitution; but the ſociety being of late years greatly enlarged, and their communications more numerous, they thought it adviſeable, that a committee of their members ſhould be appointed to re conſider the papers read before them, and ſelect out of them ſuch as they ſhould judge proper for publication in the future tranſactions, which was accordingly done upon the 26th of March, 1752.

TRANSCENDENTAL, or TRANSCENDANT, ſomething elevated, or raiſed above other things; which paſſes and tranſcends the nature of other inferior things.

Tranſcendental quantities, among geometricians, are indeterminate ones, or ſuch as cannot be fixed, or expreſſed by any conſtant equation: ſuch are all tranſcendental curves, which cannot be defined by any algebraic equation; or which, when expreſſed by an equation, one of the terms thereof is a variable quantity. Now whereas algebraiſts uſe to aſſume ſome general letters or numbers, for the quantity ſought in theſe tranſcendental problems, Mr. Leibnitz aſſumes general or indefinite equations for the lines ſought; *e. gr.* putting x and y for the abſciſs and ordinate, the equation he uſes for a line ſought is $a+bx+cy+exy+fxx+gyy$&c.$=o$, by the help of which indefinite equation, he ſeeks the tangent; and by comparing the reſult with the given property of tangents, he finds the value of the aſſumed letters a, b, c, d, &c. and thus defines the equation of the line ſought.

If the compariſon above-mentioned, do not proceed, he pronounces the line ſought not to be an algebraical, but a tranſcendal one. This ſuppoſed, he goes on to find the ſpecies of tranſcendency: for ſome tranſcendentals depend on the general diviſion or ſection of a ratio, or upon the logarithms; others, upon the arcs of a circle; and others, on more indefinite and compound enquiries. He therefore, beſides the ſymbols x and y, aſſumes a third, as v, which denotes the tranſcendental quantity; and of theſe three, forms a general equation for the line ſought, from which he finds the tangent, according to the differential method, which ſucceeds even in tranſcendential quantities. The reſult he compares with the given properties of the tangent, and ſo diſcovers, not only the values of a, b, c, d, &c. but alſo the particular nature of the tranſcendental quantity. And though it may ſometimes happen, that the ſeveral tranſcendentals are ſo to be made uſe of, and thoſe of different natures too, one from another; alſo, though there be tranſcendents of tranſcendentals, and a progreſſion of theſe in infinitum: yet we may be ſatisfied with the moſt eaſy and uſeful one; and for the moſt part, may have recourſe to ſome peculiar artifices for ſhortening the calculus, and reducing the problem to as ſimple terms as may be.

This method being applied to the buſineſs of quadratures, or to the invention of quadratrices, in which the property of the tangent is always given, it is manifeſt, not only how it may be diſcovered, whether the indefinite quadrature may be algebraically impoſſible; but alſo, how, when this impoſſibility is diſcovered, a tranſcendental quadratrix may be found, which is a thing not before ſhewn. So that it ſeems, that geometry, by this method, is carried infinitely beyond the bounds to which Vieta and Des Cartes brought it; ſince, by this means, a certain and general analyſis is eſtabliſhed, which extends to all problems of no certain degree, and conſequently not comprehended within algebraical equations.

Again, in order to manage tranſcendental problems, wherever the buſineſs of tangents or quadratures occurs, by a calculus, there is hardly any that can be imagined ſhorter, more advantageous, or more univerſal, than the differential calculus, or analyſis of indiviſibles and infinites.

By

By this method, we may explain the nature of tranſcendental lines, by an equation; *e. gr.* let a be the arch of a circle, and x the verſed ſine; then will $a = \frac{Sdx}{\sqrt{2x-xx}}$; and if the ordinate of the cycloid be y, then will $y = \sqrt{2x-xx} + \frac{Sdx}{\sqrt{2x-xx}}$; which equation perfectly expreſſes the relation between the ordinate y and the abſciſs x, and from it all the properties of the cycloid may be demonſtrated.

Thus is the analytical calculus extended to thoſe lines, which have hitherto been excluded; for no other reaſon, but that they were thought incapable of it.

TRANSCOLATION, in pharmacy, the ſame with filtration, or percolation. See the article FILTRATION.

TRANSCRIPT, a copy of any original writing, particularly that of an act, or inſtrument, inſerted in the body of another.

TRANSFER, in commerce, *&c.* an act whereby a perſon ſurrenders his right, intereſt, or property in any thing moveable or immoveable to another.

The term transfer, is chiefly uſed for the aſſigning and making over ſhares in the ſtocks, or public funds, to ſuch as purchaſe them of the proprietors.

TRANSFUSION, *tranſuſio*, the act of pouring a liquor out of one veſſel into another.

TRANSFUSION *of the blood*, in ſurgery, the conveying the arterial blood of one man or animal, into the veins of another. See the article INJECTION.

Notwithſtanding injections and transfuſions are ſeldom practiſed by our modern ſurgeons, they were highly celebrated, and often performed in the laſt century. The generality of phyſicians, not without reaſon, attribute moſt diſorders of the body to ſome vice in the blood, and therefore, ſome were led to think, that no method could be more ready to remove and correct that vice, than injecting a proper medicine in the veins to mix with the blood itſelf, or the transfuſing the ſound blood of one animal into the veins of another, inſtead of that which is diſeaſed. But notwithſtanding the vaſt expectations which had been formed by phyſicians from this operation, frequently the event turned out worſe than the diſeaſe; for we are told, that almoſt all the patients who have been treated this way, degenerated into a ſtupidity, fooliſhneſs, or a raving, or melancholy madneſs, or have been taken off with a ſudden death, either in, or not long after, the operations.

For the transfuſion of blood into the veins, firſt, a vein is to be opened in the patient's arm, or hand, and then a ſmall tube of ſilver, braſs or ivory, thruſt upward into it: the ſame is to be done with the ſound perſon, only the tube muſt here be inſerted downward, towards the ſmall end of the vein; this done, the ſmalleſt of the tubes is to be inſerted into the other larger one, by which means, as much blood will paſs from the ſound perſon into the patient, as may be thought proper, and then the inciſed veins are to be dreſſed, or bound up, as in bleeding: if the patient does not recover after one transfuſion, the operation ſhould be repeated again, at convenient intervals; but before the patient receives the blood of the ſound perſon, he ought to be bled proportionably, that the new blood laſt received, may have the freer circulation. Sometimes a vein is opened in each arm of the patient at the ſame time, that as much of the vitiated blood may flow out of one oriſice as he receives of the ſound by the other. If the blood is to be transfuſed out of ſome animal into the patient, then a calf or a lamb, for example, is to be ſecured by ligatures, and one of their veins or arteries opened in the neck, leg, or thigh, and the reſt of the operation managed as before.

TRANSGRESSION, *tranſgreſſio*, an offence againſt ſome law, or a breach or violation thereof.

TRANSGRESSIONE, in our law, is a writ uſually called a writ or action of treſpaſs.

TRANSILVANIA, a principality bounded by the Carpathian mountains, which divide it from Poland on the north; by Moldavia on the eaſt; by Walachia, and part of Hungary, on the ſouth; and by another part of Hungary on the north; being about 120 miles long, and almoſt as many broad, and lying between 22 and 25 degrees eaſt long. and between 45 and 48° of north lat.

TRANSIT, *tranſitus*, in aſtronomy, ſignifies the paſſage of any planet, juſt by, or over a fixed ſtar, or the ſun, and of the moon in particular, covering or moving over any planet.

TRANSITION, in muſic, is when a greater note is broken into a leſs, to ſoften the roughneſs of a leap by a gradual paſſage to the next note following; whence it is commonly called the breaking of a note. See NOTE and PASSAGE.

TRANSITION, in rhetoric, is of two ſorts. The firſt is when a ſpeech is introduced abruptly without expreſs notice given of it; as when Milton gives an account of our firſt anceſtor's evening devotions.

Both turned, and under open ſky adored
The God that made both air, ſky, earth and heaven.—
—— Thou alſo mad'ſt the night,
Maker omnipotent, and thou the day!

The ſecond ſort of tranſition is, when a writer ſuddenly leaves the ſubject he is upon, and paſſes unto another, from which it ſeems different at firſt view, but has a relation and connection with it, and ſerves to illuſtrate and enlarge it.

TRANSITIVE, in grammar, an epithet applied to ſuch verbs as ſignify an action which paſſes from the ſubject that does it, to or upon another ſubject which receives it. Under the head of verbs tranſitive, come what we uſually call verbs active and paſſive; other verbs, whoſe action does not paſs out of themſelves, are called neuters, and by ſome grammarians, intranſitives.

TRANSITORY, in common law, ſtands in oppoſition to local; thus actions are ſaid to be tranſitory, which may be laid in any county or place. See LOCAL.

TRANSLATION, the act of transferring or removing a thing from one place to another; we ſay the tranſlation of a biſhop's ſee, a council, a ſeat of juſtice, &c.

TRANSLATION is alſo uſed for the verſion of a book, or writing out of one language into another.

TRANSMARINE, ſomething that comes from, or belongs to, the parts beyond ſea.

TRANSMIGRATION, the removal or tranſlation of a whole people into another country, by the power of a conqueror.

TRANSMIGRATION, is particularly uſed for the paſſage of a ſoul out of one body into another, being the ſame with what we otherwiſe call metemphſychoſis. See the article METEMPHSYCHOSIS.

TRANSMISSION, in optics, &c. the act of a tranſparent body paſſing the rays of light through its ſubſtance, or ſuffering them to paſs; in which ſenſe the word ſtands oppoſed to reflection. Tranſmiſſion is alſo frequently uſed in the ſame ſenſe with refraction, by which moſt bodies, in tranſmitting the rays, do alſo refract them. For the cauſe of tranſmiſſion, or the reaſon why ſome bodies tranſmit, and others reflect the rays, ſee OPACITY and TRANSPARENCY.

The rays of light, Sir Iſaac Newton obſerves, are ſubject to fits of eaſy tranſmiſſion and reflection. See LIGHT.

TRANSMUTATION, the act of tranſforming, or changing one nature into another. Nature, Sir Iſaac Newton obſerves, ſeems delighted with tranſmutations: he goes on, to enumerate ſeveral kinds of natural tranſmutations; groſs bodies, and light, he ſuſpects, may be mutually tranſmuted into each other; and adds, that all bodies receive their active force from the particles of light, which enter their compoſition. For all fixed bodies, when well heated, emit light as long as they continue ſo; and again, light intermingles itſelf, and inheres in bodies, as often as its rays fall on the ſolid particles of thoſe bodies. Again, water, which is a fluid, volatile, taſteleſs ſalt, is by heat, tranſmuted into a vapour, which is a kind of air, and by cold, into ice, which is a cold tranſparent brittle ſtone, eaſily diſſolvable, and this ſtone is convertible again into water by heat, as vapour is by cold. See WATER, VAPOUR, ICE, &c.

Earth, by heat, becomes fire; and by cold, is converted into earth again; denſe bodies, by fermentation, are rarified into various kinds of air; and that air, by fermentation alſo, and ſometimes without, reverts into groſs bodies. Quickſilver ſometimes puts on the form of a fluid metal, ſometimes it appears in ſhape of a pellucid fragile ſalt, called ſublimate; ſometimes of a pellucid volatile white taſteleſs earth, called mercurius dulcis; by diſtillation it becomes vapour, and by agitation in vacuo, it ſhines like fire, &c. See EARTH, MERCURY, &c. All bodies, beaſts, fiſhes, inſects, plants, &c. with all their various parts, grow and increaſe out of water, and aqueous and ſaline tinctures; and by putrefaction, all of them revert into water, or an aqueous liquor again. Farther, water expoſed a while to the open air, puts on a tincture, which, in proceſs of time, has a ſediment and a ſpirit, and before putrefaction, yields nouriſhment both for animals and vegetables.

TRANSMUTATION, in alchemy, denotes the art of changing or exalting imperfect metals into gold or ſilver. This is alſo called the grand operation, and, they ſay, is to be effected with the philoſopher's ſtone. See the article PHILOSOPHER'S STONE.

Some alchemiſts hold, that the tranſmutation ſhould rather be called the perfection of imperfect metals; as holding all metals intended by nature, to arrive equally at the perfection of gold, in as much as they are compoſed of the ſame matter; and that it is only the impurity of their matrices, that is, of the place wherein they are formed by nature, that has prevented their arriving thereat. The elixir being projected on any of theſe metals, it is ſuppoſed to purge and ſeparate the impure parts from the pure, and to join itſelf wholly to the mercury (which is the pureſt part) as being of the ſame nature.

Whether or no metals may be tranſmuted into one another, is a point ſtrongly diſputed among philoſophers; the alchemiſts ſtrenuouſly aſſerting the affirmative. Some metals, it is commonly ſuppoſed, may be changed into others, *e.g.* iron into copper, and lead into tin; but Cardan, and ſome others, deny even this, and argue farther, that though iron and braſs, as being nearly alike in weight and tenacity, *&c.* provided their colour and hardneſs could be changed, might be converted into one another, either really or at leaſt apparently; yet would the tranſmuting or ripening of other metals into gold or ſilver, be ſtill not leſs impoſſible; both as theſe metals are all to be firſt calcined, after which they can never again be brought back to their priſtine purity, and as there is a generation required which is not the work of art but of nature. Cardan, Lemery, Dickenſon, and others, give us accounts of the various impoſtures of adepti in the buſineſs of tranſmutation; ſome, for inſtance, fixing mercury with verdigreaſe, and then heightening the colour with cadmia, *&c.* but this, if tried with the coppel, all goes off in fumes; and, in effect, nothing produced this way ought to be adjudged true gold, unleſs it endure copelling and cementation, purification with antimony, and the depart. Add, that it muſt have the malleability, extreme ductility, and ſpecific gravity of gold. See GOLD, *&c.*

TRANSMUTATION, in geometry, denotes the reduction or change of one figure or body into another of the ſame area or ſolidity, but of a different form; as a triangle into a ſquare, a pyramid into a parallelopiped, *&c.* In the higher geometry, tranſmutation is uſed for the converting a figure into another of the ſame kind and order, whoſe reſpective parts riſe to the ſame dimenſions in an equation, admit of the ſame tangents, *&c.* If a rectilinear figure be tranſmuted into another, it is ſufficient that the interſections of the lines which compoſe it be transferred, and the lines drawn through the ſame in the new figure. If the figure to be tranſmuted be curvelinear, the points, tangents, and other right lines by means whereof the curve line is to be defined, muſt be transferred.

TRANSOM, among builders, denotes the piece that is framed acroſs a double light window. See WINDOW.

TRANSOM, among mathematicians, ſignifies the vane of a croſs-ſtaff, or a wooden number fixed acroſs, with a ſquare whereon it ſlides, *&c.* See CROSS-STAFF.

TRANSOM, in a ſhip, a piece of timber which lies athwart the ſtern, between the two faſhion-pieces, directly under the gun-room-port. See the article SHIP.

TRANSPARENCY, *diaphaneity*, in phyſics, a quality in certain bodies whereby they give paſſage to the rays of light, in contradiſtinction to opacity, or that quality of bodies which renders them impervious to the rays of light. For the doctrine of tranſparency, ſee the article OPACITY.

TRANSPIRATION, the inſenſible, or almoſt inſenſible, paſſage of an excrementitious matter through the pores of the ſkin, called alſo perſpiration. See the article PERSPIRATION.

TRANSPIRATION is alſo uſed by ſome authors for the ingreſs or entrance of the air, vapour, *&c.* through the pores of the ſkin into the body. Cardan, by this kin of tranſpiration, accounts for the prodigy of a woman whoſe daily urine weighed twenty ſeven pounds, though all the food ſhe took, both dry and liquid, did not exceed four pounds. Dr. Baynard alſo ſuſpects ſome ſuch tranſpiration to be the caſe in hydropical perſons.

TRANSPLANTATION, in agriculture and gardening, the act of removing trees or plants from the places where they were

ſowed, or raiſed, and planting them in others. See the article PLANTING.

TRANSPLANTATION, in natural magic, is uſed for a method of curing diſeaſes, by transferring them from one ſubject to another, which was much in vogue among certain chemical or rather ſympathetical phyſicians ſome years ago. A ſubject too whimſical to deſerve further notice.

TRANSPORTATION, the act of conveying or carrying a thing from one place to another.

Tranſportation is a kind of puniſhment, or more properly an alleviation or commutation of puniſhment, for criminals convicted of felony, who for the firſt offence, unleſs it be an extraordinary one, are generally tranſported to the plantations, there to bear hard labour for a term of years; within which, if they return, they are executed without farther trial.

TRANSPORTATION *of plants.* In ſending plants from one country to another, great cautions are neceſſary. The plants ſent from a hotter country to a colder, ſhould be always put on board in the ſpring of the year, that the heat of the ſeaſon may be advancing as they approach the colder climates; and, on the contrary, thoſe which are ſent from a colder country to a hotter, ſhould be ſent in the beginning of winter. The beſt way of packing up plants for a voyage, if they be ſuch as will not bear keeping out of the earth, is to have boxes with handles, filling them with earth, and planting the roots as cloſe together as may be; the plants ſhould be ſet in theſe boxes three weeks before they are to be put on board; and in good weather they ſhould be ſet upon the deck; and in bad removed or covered with a tarpaulin. If they are going from a hotter country to a colder one, they muſt have very little moiſture; if, on the contrary, they are going from a colder to a warmer, they may be allowed water more largely, and being ſhaded from the heat of the ſun, they will come ſafe.

A great many plants, however, will live out of the earth a conſiderable while; as the ſedums, euphorbiums, ficoides, and other ſucculent ones. Theſe need no other care than the packing them up with moſs in a cloſe box; and there ſhould be a little hay put between them, to prevent them from wounding or bruiſing one another, and holes bored in the boxes to keep them from heating and putrefying. In this manner they will come ſafe from a voyage of two or three, or even four or five months. Several trees alſo will come ſafe in the ſame manner; taking them up at a ſeaſon when they have done growing, and packing them up with moſs. Of this ſort are oranges, olives, capers, jaſmines, and pomegranate-trees. Theſe, and many others, are annually brought over to us from Italy; and, though they are three or four months in the paſſage, ſeldom miſcarry. The beſt way of ſending over ſeeds, is in their natural huſks, in a bag, or packed up in a gourd-ſhell, keeping them dry, and out of the way of vermin.

TRANSPOSITION, in algebra, the bringing any term of an equation over to the other ſide. See EQUATION.

TRANSPOSITION, in grammar, a diſturbing or diſlocating of the words in a diſcourſe, or a changing of their natural order of conſtruction, to pleaſe the ear by rendering the contexture more eaſy, ſmooth, and harmonious. A tranſpoſition which renders the ſenſe perplexed, is vicious. The conſtitution of the antient languages, being much more artful than that of the modern ones, allowed of much greater and more frequent tranſpoſitions. The Engliſh, French, &c. ſcarce ever allowed of them but in oratory and poetry, in which caſes they ſerve to give a force and energy to the diſcourſe or the verſe, and to prevent their languiſhing.

TRANSPOSITION, in muſic, is a changing of the notes of a piece of muſic, or the ſhifting a ſong from its former ſituation, to ſet it either higher or lower, or in another octave.

Of this there are two kinds, the firſt is with reſpect to the clef, the ſecond with reſpect to the key. Tranſpoſition, with reſpect to the clef, conſiſts in the changing the places or ſeats of the notes or letters among the lines and ſpaces, but ſo as that every note is ſet at the ſame letter. This is done either by removing the ſame clef to another line, or by uſing another clef, but with the ſame ſignature, by reaſon the piece is in the ſame key. See the article CLEF.

The practice is eaſy in either caſe. In the firſt you take the firſt note at the ſame diſtance, either above or below the clef-note, in its new poſition, as before, and all the reſt of the notes in the ſame relations or diſtances from one another, ſo that the notes are all ſet on lines and ſpaces of the ſame name. In the ſecond, or

ſetting

ſetting of the muſic to a different clef, it is to be obſerved the places of the three clef-notes are invariable in the ſcale, and are to one another in theſe relations, the mean a fifth above the baſs, and the treble a fifth above the mean. Now to tranſpoſe a new clef, for example, from the treble to the mean, wherever the new clef is ſet, we ſuppoſe it the ſame individual note in the ſame place of the ſcale, as if the piece were that part in the compoſition to which the new clef is generally appropriated, ſo that it may direct to the ſame notes we had before tranſpoſition. Now from the fixed relations of the three clefs in the ſcale, it will be eaſy to find the ſeat of the firſt tranſpoſed note, and then all the reſt are to be ſet at the ſame mutual diſtances they were at before. See the article SCALE.

Suppoſe, for example, the firſt note of a ſong be *d*, a ſixth above the baſs-clef; wherever that clef is placed, the firſt note muſt be a greater ſecond above it; becauſe a greater ſecond above the mean, is a greater ſixth above the baſs-clef, the relation between the two being a fifth: ſo that the firſt note will ſtill be the ſame individual note *d*. The uſe of this tranſpoſition is, that if a ſong be ſet with a certain clef in a certain poſition, the notes go far above or below the ſyſtem of five lines, they may, by the change of the place of the ſame clef in the particular ſyſtem, or by taking a new clef, be brought more within the compaſs of the lines.

Tranſpoſition from one key to another, is the changing of the key, or a ſetting all the notes of a ſong at different letters, and performing it conſequently in different places upon the inſtrument. See the article KEY.

The deſign hereof is, that a ſong which being begun in one place is too high, too low, or otherwiſe inconvenient for a certain inſtrument, may be begun in another place, and from that carried on through all its juſt degrees. The clef and its poſitions here remain the ſame, and the change is of the notes themſelves, from one letter, and its line or ſpace, to another. In the former tranſpoſition the notes were expreſſed by the ſame letters, but both removed to different lines and ſpaces; in this the letters are unmoved, and the notes of the ſong transferred to or expreſſed by other letters, and conſequently ſet upon different lines and ſpaces, which therefore requires a different ſignature of the clef.

TRANSUBSTANTIATION, *tranſubſtantiatio*, in theology, the converſion or change of the ſubſtance of the bread and wine in the euchariſt, into the body and blood of Jeſus Chriſt, which the romiſh church hold is wrought by the conſecration of the prieſt. This is a main point in the romiſh religion, and is rejected by the proteſtants, the former maintaining the tranſubſtantiation to be real, the latter only figurative; interpreting the text *hoc eſt corpus meum*, "this ſignifies my "body:" but the council of Trent ſtood up ſtrenuouſly for the literal ſenſe of the verb *eſt*, and ſay expreſsly, that in tranſubſtantiation the body and blood of our Lord Jeſus Chriſt are truly, really, and ſubſtantially under the ſpecies of bread and wine. The controverſies about this point, are almoſt innumerable.

TRANSUMPTION, *tranſumptio*, in the ſchools, a ſyllogiſm by conceſſion or agreement, uſed where a queſtion propoſed is transferred to another; with this condition, that the proof of this latter ſhould be admitted for a proof of the former. See the article SYLLOGISM.

TRANSVERSALIS, in anatomy, a name given to ſeveral muſcles, *&c.* in reſpect to their ſituation, progreſs, *&c.* as, 1. The tranſverſalis abdominis, a muſcle which lies under the obliqui, and ariſes from the cartilago xiphoides, from the extremities of the falſe ribs, from the tranſverſe apophyſis of the vertebræ of the loins, is fixed to the innerſide of the ſpine of the ileum, and inſerted in the os pubis and the linea alba. This, with the obliqui, unites its tendons as it approaches the linea alba, and is the only muſcle that is cut in the operation of the bubonocele. It has a fine and thin membrane, that cloſes exactly its ring or hole through which the veſſels paſs. 2. Tranſverſalis colli, is ſaid to be a part of the longiſſimus dorſi. It ariſes from the os ſacrum, and from all the tranſverſe proceſſes of the vertebræ of the loins, back and neck, except the two firſt; and is inſerted by ſo many diſtinct tendons into all the ſuperior ſpines. It moves the whole ſpine obliquely backwards. 3. Tranſverſalis pedis placentini, comes from the bone of the metatarſus that ſuſtains the toe next the little toe, and paſſing acroſs the other bones, is inſerted into the os ſeſamoides of the toe. Its uſe

is

is to bring all the toes close to one another. 4. Transversalis penis, one of the dilators of the urethra, arising from the tubercle of the os ischium on each side, and inserted into the posterior part of the bulb of the urethra; however these muscles are not quite determinate and certain in their origin or insertion, and sometimes they are wholly wanting: when they act, they dilate the urethra in its posterior part. 5. Transversalis is also a name given to a suture of the cranium, because of its traversing or crossing the face from one side to another. See SKULL.

TRANSVERSE, something that goes across another, from corner to corner: thus bends and bars, in heraldry, are transverse pieces or bearings: the diagonals of a parallelogram or a square, are transverse lines: lines which make intersections with perpendiculars, are also called oblique or transverse lines.

For the transverse axis or diameter, called also the first and principal axis, see the articles AXIS, DIAMETER, LATUS *transversum*, ELLIPSIS, *&c.*

TRANSVERSE MUSCLES, in anatomy, are certain muscles arising from the transverse processes of the vertebræ of the loins. See the article TRANSVERSALIS.

TRAPA, in botany, a genus of the *tetrandria monogynia* class of plants, the corolla whereof consists of four petals, vertically ovated, and larger than the cup: the fruit is a hard osseous capsule, of an oblong oval figure, containing only one cell, and armed with four sharp, thick spines, placed oppositely in the middle of the sides, and pointed; these before were the leaves of the calyx: the seed is a covered single nucleus, of an oval figure.

TRAPANO, a city and port-town of Sicily, situated on the most western parts of the island, in east long. 12° 8′, north lat. 38°.

TRAPEZIUM, in geometry, a plane figure contained under four unequal right lines. 1. Any three sides of a trapezium taken together, are greater than the third. 2. The two diagonals of any trapezium, divide it into four proportional triangles. 3. If two sides of a trapezium be parallel, the rectangle under the aggregate of the parallel sides and one half their distance, is equal to that trapezium. 4. If a parallelogram circumscribes a trapezium, so that one of the sides of the parallelogram be parallel to a diagonal of the trapezium, that parallelogram will be the double of the trapezium. 5. If any trapezium has two of its opposite angles, each a right angle, and a diagonal be drawn joining these angles; and if from the other two angles be drawn two perpendiculars to that diagonal, the distances from the feet of these perpendiculars to those right angles, respectively taken, will be equal. 6. If the sides of a trapezium be each bissected, and the points of bissection be joined by four right lines, these lines will form a parallelogram, which will be one half of the trapezium. 7. If the diagonals of a trapezium be bissected, and a right line joins these points, the aggregate of the squares of the sides is equal to the aggregate of the squares of the diagonals, together with four times of the square of the right line joining the point of bissection. 8. In any trapezium, the aggregate of the diagonals is less than the aggregate of four right lines drawn from any point (except the intersection of the diagonals) within the figure.

TRAPEZIUS, in anatomy. See the article CUCULARIS.

TRAPEZOID, is a solid irregular figure, having four sides not parallel to one another.

TRAPEZOND, or TREBISOND, a city and port-town of asiatic Turky, in the province of Amasia, situated on the Black-sea: east long. 42° 20′, north lat. 42° 26′.

TRAVE, a river of Germany, in the circle of Lower Saxony and dutchy of Holstein, which runs from west to east by Lubeck, and falls into the Baltic at Travemund.

TRAVEMUND, a port-town of the dutchy of Holstein, situated on the Baltic-sea, at the mouth of the river Trave: east long. 10° 45′, north lat. 54° 30′.

TRAVERSE, or TRANSVERSE, in general, denotes something that goes athwart another; that is, crosses and cuts it obliquely.

Hence, to traverse a piece of ordnance, among gunners, signifies to turn or point it which way one pleases, upon the platform.

In fortification, traverse denotes a trench with a little parapet, or bank of earth, thrown perpendicularly across the moat, or other work, to prevent the enemy's cannon from raking it. These traverses may be from twelve to eighteen feet, in order to be cannon proof, and their height about six or seven feet, or more, if the place be exposed to any eminence. And to preserve a communication, a pas-

sage

ſage of about five or ſix feet wide muſt be left at one end of the traverſe. The different ways of conſtructing theſe works, are repreſented in plate CCLXXXI. fig. 2. n° 1, 2, 3 and 4.

If any part of a work, thus ſhut in by one or more traverſes, is likely to be defended by the muſketry, it will be proper to add to the traverſes one or more foot-banks within the defence, for the troops to mount on, when they want to fire over the traverſe.

TRAVERSE, in navigation, is a compound courſe, wherein ſeveral different ſucceſſive courſes and diſtances are known.

To work a traverſe, or to reduce a compound courſe to a ſingle one, 1. Make a table of ſix columns, marked courſe, diſtance, N. S. E. W. beginning at the left-hand, and write the given courſes and diſtances in their proper columns. 2. Seek the given courſes and diſtances in the traverſe table, and let the correſponding differences of latitude and departure be wrote in their proper columns in the table made for the queſtion. 3. Add up the columns of northing, ſouthing, eaſting, and weſting; then the difference between the ſums of northing and ſouthing, gives the whole difference of latitude, which is of the ſame name with the greater; and the difference between the ſums of eaſting and weſting will be the whole departure, which is likewiſe of the ſame name with the greater. 4. The whole diff. lat. and depart. to the compound courſe being found, the direct courſe and diſtance will be found by Caſe IV. of plain-ſailing. See the article NAVIGATION.

Example: Suppoſe a ſhip, in the latitude of 4° 10′ north lat. 3° 39′ E. long. ſails S. 11° W. 91 miles, S. W. 120 miles, W. N. W. 130 miles, S. E. 135 miles, S. E. by E. 130 miles, and S. W. by S. 150 miles; required the direct courſe and diſtance ſailed, and the latitude and longitude the ſhip is in?

Geometrically: draw the meridian line $p x$ (plate XL. fig. 5.) and make the the angle $q p 2$ equal to 11° 15′ = 1 point, and draw the right-line $q p$, making it equal to 88 miles, the firſt diſtance ſailed; and let fall the perpendicular $q 2$; then will q be the place of the ſhip, $p 2$ the difference of latitude, and $q 2$ the departure belonging to the firſt courſe: and after the ſame manner muſt the triangles $q 3 r$, $r s 4$, $4 t 5$, $5 u 6$, and $6 7 w$, be projected; then will w be the place of the ſhip at the end of her ſailing, $p x$ the difference of latitude, $w x$ the departure, the angle $x p w$ her direct courſe from her firſt to her laſt ſtation, and $p w$ her direct diſtance; which may be all meaſured by the inſtructions given under the article NAVIGATION.

Arithmetically: the arithmetical ſolution of this problem depends entirely on the firſt and fourth caſes of *Plane* SAILING; for firſt the correſponding difference of latitude and departure muſt be found to each courſe and diſtance, as in the firſt caſe, and placed in a table according to their ſeveral directions: that is, when the ſhip ſails to the northward, the difference of latitude muſt be placed in the north column, but, when to the ſouthward, in the ſouth column; and the departure, if ſhe ſails to the weſtward, in the weſt column, but, if to the eaſtward, in the eaſt column. Then will the totals of the ſeveral columns ſhew the northings, ſouthings, eaſtings, and weſtings the ſhip has made. And, conſequently, if the ſouthings exceed the northings, the ſhip will be to the ſouthward of her firſt ſtation, and juſt as much as is the exceſs, and *vice verſa*; in like manner, if the eaſtings exceed the weſtings, the ſhip will be to the eaſtward of her firſt meridian, but, if the contrary, to the weſtward. Then we ſhall have the whole difference of latitude and departure from the meridian given, to find the courſe and diſtance, as in the fourth caſe. See the following table,

Courſes.	Diſtances.	Diff. of lat. Northings.	Diff. of lat. Southings.	Departure. Eaſtings.	Departure. Weſtings.
S. 11° W.	91		89,3		17,2
S. W.	120		84,8		84,8
W. N. W.	130	49,8			120,1
S. E.	135		95,4	95,4	
S. E. by E.	130		73,3	108,0	
S. W. by S.	150		124,7		83,4
		49,8	467,5	203,4	305,5
			49,8		203,4
		dif.la.	417,7	depa.	102,1

Hence, it appears, that the ſhip is 417,7 miles to the ſouthward of her firſt ſtation, and 102,1 miles to the weſtward of her firſt meridian; whence we may, by the fourth caſe of plane ſailing, find her direct courſe and diſtance, as follows:

1. As

1. As the difference of latitude $px = 417,7 =$ 2.6208645
Is to the radius $= 90° 00' =$ 10.0000000
So is the departure $wx = 102,1 =$ 2.0090257
To the T. of the course or angle $wpx = 13° 44' =$ 9.3881612
Which is south 13° 44′ westerly, or something more than south by west, because the difference of latitude is southerly, and the departure westerly.

2. As the sine of the course $= 13° 44' =$ 9,3760034
Is to the departure $= 102,1 =$ 2,0090257
So is the radius $= 90° 00' =$ 10,0000000
To the distance $= 429,6 =$ 2.6330223

And, because the difference of latitude exceeds the latitude sailed from, d. m.
Therefore, from the difference of lat. $= 417,7 =$ 6 : 57,7
Take the lat. sailed from $= 4 : 10$N.
Remains the lat. the ship is in $= 2 : 47,7$S.

And, because the difference of longitude is westerly, therefore, d. m.
From the long. sailed from $= 3 : 39$E.
Take the difference of longitude $= 102,1 =$ 1 : 42,1W.
Remains the long. the ship is in $= 1 : 47,9$E.

Hence it appears, that the ship is arrived in the latitude of $2° 47,7' = 2° 47' 42''$ south, and $1° 47,9' = 1° 47' 54''$ east longitude; her direct course from her first to her last station being south, 13° 44′ westerly, distant 429,6 miles.

TRAVERSE, in law, denotes the denial of some matter of fact alledged to be done in a declaration, or pleadings; upon which the other side coming and maintaining that it was done, issue is joined for the cause to proceed to trial.

TRAVERSE *of an indictment*, or *presentment*, is the contradicting or denying some chief point of it, and taking issue thereon.

TRAVERSE *of an office*, is the proving that an inquisition made by lands or goods, is defective and untruly made.

TRAVERSE is sometimes also used, in heraldry, for a partition of an escutcheon, of figure represented in plate CCLXXXI. fig. 4. which is blazoned parti per pal traverse, argent and gules.

TRAVESTY, or TRAVESTI, a french term, derived from the verb *travestir*, to disguise one's self, or to appear in masquerade: and hence, travesty is applied to the disfiguring of an author, or the translating him into a style and manner different from his own, by which means it becomes difficult to know him.

TRAUMATICS, the same with vulnerary medicines. See VULNERARY.

TRAW, a port-town of Dalmatia, situated on the gulph of Venice, in east long. 17° 30′ and north lat. 43° 10′.

TRAYGNERA, a town of Valencia, in Spain, near the confines of Catalonia: west long. 15′ and north lat. 40° 32′.

TREACLE, *theriaca*, in pharmacy. See the article THERIACA.

Some also give the name treacle to molasses; and in this sense it is that Dr. Shaw, in his essay on distillery, has endeavoured to bring into use several sorts of treacles, which might be made at home, and would serve very conveniently for the distillation of spirits, or the making of potable liquors. These are the inspissated juices or decoctions of vegetables: such as the sweet juice of the birch, or sycamore, procured by tapping or piercing the trees in spring, and the common wort made from malt, or from other vegetable substances treated in the same manner. These liquors are severally to be boiled down in a copper till they begin to inspissate, and then to be poured into a balneum mariæ, when the remainder of the evaporation may be finished without burning the inspissated juices: thus prepared it may be at any time reduced to the state of wort, only by adding a sufficient quantity of warm water. See TAPPING.

TREASON, in general, signifies betraying; but is more particularly used for the act or crime of infidelity to one's lawful sovereign.

Treason is divided, by lawyers, into high treason, and petty treason. The first of these is an offence committed against the security of the king or kingdom; as to compass, or imagine, the death of the king, queen, or their eldest son and heir; or in case a person does violate or deflower the king's wife, or his eldest daughter unmarried, or the wife of the king's eldest son; or if he levy war against the king within his kingdom, or adhere to his enemies, give them aid or comfort within the realm, or elsewhere; or if he counterfeit the king's great or privy seal, or his money, or bring false money into the kingdom, like to what we have here, and utter the same; if he kill the chancellor, treasurer, justices of either bench, justices of assize, or of oyer and terminer, sitting in judgment and representing

the perſon of the king, in the execution of his office: all theſe caſes are deemed treaſon by 25 Ed. III. c. 2. which ſtatute is made the only ſtandard of high-treaſon; and 1 Mary c. 1. takes away the power of the king and parliament to adjudge any thing elſe to be high-treaſon but what is declared to be ſuch therein: it is true, temporary ſtatutes of late times enacted, have made ſome other offences treaſon, as relating to papiſts and the proteſtant ſucceſſion.

It has been held, that words only, where they are deliberate, and ſhew a direct purpoſe againſt the king's life, will amount to an overt act of compaſſing or imagining his death, and are high-treaſon: for words are the moſt natural way of expreſſing the imagination of the heart, and may be good evidence of it: not only words of perſwaſion to kill the king, but ſuch as are ſpoken in order to draw away the affections of his people, and to ſtir them up againſt him, are tending to the king's death, and therefore treaſon. Likewiſe where a perſon intends by force to preſcribe laws to the king, or to reſtrain him of his royal power, it has been adjudged an intention to deprive him of his crown and life; and in the eye of the law, every rebellion is a treaſonable plot againſt the life of the king, for a rebel would not ſuffer that king to live and reign, who would puniſh his offence.

As to make a crime treaſon, there muſt be always ſome overt-act; a bare conſpiracy, or compaſſing to levy war, is no ſuch act, unleſs it be really levied; in which caſe the conſpirators are all traitors, although they are not in arms: perſons that raiſe forces for any public end or purpoſe, or who make an inſurrection on any account, are ſaid to levy war againſt the king, though perhaps without a direct deſign againſt his perſon; and it extends to the caſe where great numbers forcibly endeavour to remove certain perſons from the king, &c. The adhering to the king's enemies, is taken to be an adherence againſt him, and even out of the realm it is treaſon: and it is ſaid, that cruiſing in a ſhip of war with an intent to deſtroy the king's ſhips, though no act of hoſtility be committed, is an overt-act of adhering, comforting and aiding.

All trials for high-treaſon are to be according to the courſe of the common law; and perſons indicted for this crime, are to have a copy of the indictment five days before their trial, that they may have ſufficient time to adviſe with council; they ſhall likewiſe be permitted to make a full defence by their council learned in the law, and by lawful witneſſes, &c. And in this caſe there muſt be two evidences to the ſame overt-act, or to two acts of the ſame treaſon, produced face to face againſt them. It is alſo ſaid, where a perſon is convicted of treaſon, the omiſſion of any neceſſary part of the judgment will be held to be error, on which he may reverſe the attainder; as the judgment is ſeverer, and more formidable, in caſe of high-treaſon than for any other crime whatever; ſince the offender is to be hanged, drawn, and quartered, and alſo forfeit his lands and goods to the king.

Petty-treaſon, is where a ſervant kills his maſter, a wife her huſband, or a ſecular or religious perſon kills his prelate or ſuperior, to whom he owes faith and obedience; and aiders and abettors, as well as procurers, are within the act. However, ſo ſtrictly is the ſtatute conſtrued, that no caſe not expreſly mentioned therein is puniſhable by it: hence if a ſon kill his father, he ſhall not be tried for petty treaſon, except he ſerved his father for wages, in which caſe he is to be indicted under the name of a ſervant.

Petty-treaſon implies the higheſt degree of murder, and occaſions the forfeiture of lands by eſcheat to the lord of the fee; and the further puniſhment of the criminal is to be hanged, drawn, and quartered for it, and a woman burnt.

TREASURE, in general, denotes a ſtore or ſtock of money in reſerve. See the article MONEY.

Treaſure-trove, in law, is where any treaſure is found buried in the earth, but not lying on the ground, and no man knows to whom it belongs: this, in England, belongs to the king, and to conceal it is puniſhable by fine and impriſonment.

TREASURER, an officer to whom the treaſure of a prince, or corporation, is committed to be kept, and duly diſpoſed of.

The lord high treaſurer of Great Britain, or firſt commiſſioner of the treaſury, when in commiſſion, has under his charge and government all the king's revenue, which is kept in the exchequer. He holds his place during the king's pleaſure, being inſtituted by the delivery of a white ſtaff to him: he has the check of

all the officers employed in collecting the cuſtoms and other royal revenues; and in his gift and diſpoſition are all the offices of the cuſtoms in the ſeveral ports of the kingdom; eſcheators in every county are nominated by him; he alſo makes leaſes of the lands belonging to the crown.

There is, beſides the lord treaſurer, a treaſurer of the king's houſhold, who is of the privy council, and, with the comptroller and ſteward of the marſhalſea, has great power.

To theſe may be added the treaſurer of the navy; as alſo the treaſurer of the king's chamber, and of the wardrobe; and moſt corporations throughout the kingdom have treaſurers, whoſe office is to receive their rents, and diſburſe their common expences.

The treaſurer of the county, is an officer that keeps the county-ſtock, in which office there are two in every county; who are choſen by the major part of the juſtices of the peace at Eaſter-ſeſſions. They ought to have certain eſtates in lands, or to be worth 150l. in perſonal eſtate, and are to continue in their office only for a year, at the end whereof, or within ten days after the expiration of the year, they muſt account to their ſucceſſors, under certain penalties. The county-ſtock which this officer has the keeping of, is raiſed by rating every pariſh annually; and the ſame is from time to time diſpoſed of to charitable uſes, towards the relief of maimed ſoldiers and mariners, priſoners in the county gaols, paying the ſalaries of governors of houſes of correction, and relieving poor alms-houſes, *&c.*

TREASURY, the place wherein the revenues of a prince are received, preſerved, and diſburſed.

In England, the treaſury is part of the exchequer, by ſome called the lower exchequer. See EXCHEQUER.

Lords of the TREASURY. In lieu of one ſingle director and adminiſtrator of his majeſty's revenues under the title of lord high treaſurer, it is at preſent thought proper to put that office in commiſſion, *i. e.* to appoint ſeveral perſons to diſcharge it with equal authority, under the title of lords commiſſioners of the treaſury.

TREATISE, *tractatus*, a ſet diſcourſe in writing on any ſubject. A treatiſe is ſuppoſed more expreſs, formal, and methodical than an eſſay, but leſs ſo than a ſyſtem.

TREATY, a covenant between two or more nations; or the ſeveral articles or conditions ſtipulated and agreed upon between ſovereign powers.

Treaties are of various kinds; as treaties of peace, of alliance, of commerce, *&c.* for the guaranty of which, ſee the article GUARANTY.

TREBIGNA, a town of european Turky, in the province of Dalmatia, near the gulph of Venice: eaſt long. 19°, north lat. 42° 40′.

TREBLE, in muſic, the higheſt or acuteſt of the four parts in ſymphony, or that which is heard the cleareſt and ſhrilleſt in a concert. See the article CLEF.

TREE, *arbor*, the firſt and largeſt of the vegetable kind, conſiſting of a ſingle trunk, out of which ſpring forth branches and leaves.

Standard-trees are ſuch as naturally riſe to a great height, and are not topped.

For the choice of trees of this kind to be tranſplanted out of a nurſery, Quintiney recommends us to ſuch as are ſtraight, ſix feet high at leaſt, and five or ſix inches thick at bottom, and three or four at top; the bark pretty ſmooth and ſhining, as a token of their youth, and of the good ſoil they grew in.

Dwarf-trees are ſuch as are kept low, and never ſuffered to have above half a foot of ſtem. See the article DWARF.

Fruit-TREES. See the article FRUIT.

For the planting, pruning, felling, grafting, *&c.* of trees, ſee PLANTING, PRUNING, *&c.*

TREFOIL, *trifolium*, in botany, a genus of the *diadelphia-decandria* claſs of plants, with a papilionaceous flower: its fruit is a ſhort univalve pod, or capſule, containing a few roundiſh ſeeds.

Trefoil, or clover, is a plant greatly eſteemed by the engliſh farmers, for the great improvement it makes upon land, the goodneſs of its hay, and the value of its ſeed. The great advantage of clover, or trefoil, to the land on which it grows is, that it feeds a vaſt number of cattle at a time; and their dung is ſo rich a manure to the ground, that in two or three years time it becomes fit for corn again, though it had been ever ſo much exhauſted before. Clayey lands, in particular, are greatly improved by it.

There are ſeveral kinds of clover, but the great ſort is eſteemed the beſt, whoſe ſeed is like that of muſtard, except that it is more oblong. The engliſh ſeed is preferable to that of all other places, and

the

the farmer ſhould chooſe ſuch as is of a greeniſh colour, with a caſt of red; that which is black never growing ſo well. An acre of land will require ten pounds of ſeed, ſometimes twelve pounds, and it is better to ſow too much than too little. It delights moſt in a rich warm ſoil, and always thrives beſt in thoſe lands which have been well dunged or manured; but the clay-lands, which are long in acquiring a coat of graſs, or ſwarding, as the farmers expreſs it, and are little ſubject to weeds, are of all others the beſt land for clover; becauſe in thoſe lands, where the common graſs grows ſpeedily, it ſoon eats out the clover.

Marſh-TREFOIL, *trifolium paluſtre*, in botany, *&c.* the ſame with the menyanthes or buckbean. See MENYANTHES.

Shrub-TREFOIL, *cytiſus*, in botany. See the article CYTISUS.

TREFURT, a town of upper-Saxony, twenty-two miles weſt of Saxe-Gotha.

TREGONY, a borough of Cornwal, forty miles ſouth-weſt of Launceſton. It ſends two members to parliament.

TREILEBOURG, a port town of Schonen, in Sweden, ſituated on the Baltic-ſea, thirty miles ſouth-eaſt of Coppenhagen.

TREMELLA, LAVER, in botany, a genus of ſea-plants, of a middle nature, between the alga and conferva, being of a pellucid and membranaceous, and frequently of a gelatinous ſtructure.

TREMOR, or TREMBLING *of the joints*, in medicine, is an involuntary ſhaking, chiefly of the hands and head, ſometimes of the feet, and ſometimes of the tongue and heart. It is a diſorder which frequently attacks perſons advanced in years, and ſometimes the younger ſort. It ſeems to ariſe from a defect of ſpirits, ſometimes from terror, or other violent paſſion, and ſometimes from a plethora. Too much drinking of coffee alſo produces a tremor in ſome perſons, as too plentiful drinking and ſurfeits will in others.

Tremors are often dangerous, as being apt to degenerate into other nervous diſtempers; as ſpaſms, the palſy, lethargy, apoplexy, *&c.*

In the cure, thoſe things ſhould be avoided that promote the diſeaſe, and the patient ſhould drink balm or ſage-tea, or a diet-drink made of china-root; peruvian bark may alſo be taken, in an infuſion of balm or ſage, or ſuccinated ſpirit of hart's-horn, twice or thrice in a day; and in the evening an antiſpaſmodic powder may be taken, eſpecially if the patient is hot, or uſes much wine. Outwardly, the neck and ſpine of the back may be rubbed with the ſpirits of ants, earth-worms, and ſal ammoniac, mixed together; a fourth part of the volatile ſpirits will be ſufficient, or opodeldoc may be uſed in their ſtead. If the patient is plethoric, bleeding is uſeful; and in old perſons, a draught of generous wine at meals: pediluvia, hot-baths, and mineral-waters, may alſo be uſed, but with caution.

As to the medicine commonly uſed in tremors and other nervous diſtempers, under the name of palſy-drops, it is no other than compound ſpirit of lavender; the moſt ſucceſsful way of uſing which is, by taking thirty or forty drops twice or thrice a day, dropped on loaf-ſugar or a little bread. It is ſuppoſed that by this way the moſt ſpirituous and efficacious parts make their way directly by the nerves of the palate, *&c.* without undergoing the courſe of the circulation, as it is ſaid to do when taken in a liquid vehicle.

TRENCHES, in fortification, are ditches cut by the beſiegers, that they may approach more ſecurely to the place attacked; whence they are alſo called lines of approach. The tail of the trench is the place where it was begun, and its head is the place where it ends.

The trenches are uſually opened, or begun, in the night time; ſometimes within muſket-ſhot, and ſometimes within half or whole cannon-ſhot of the place. They are carried on in winding-lines, nearly parallel to the works of the fortreſs, ſo as not to be in the view of the enemy, nor expoſed to the enemy's ſhot. The workmen employed in the trenches are always ſupported by a number of troops, to defend them againſt the ſallies of the beſieged: the pioneers ſometimes work on their knees, and are uſually covered with mantlets or ſauciſſons; and the men who ſupport them lie flat on their faces, in order to avoid the enemy's ſhot.

TRENCHE, or TRANCHE', in heraldry. See the article TRANCHE'.

TRENT BISHOPRIC, a province of Germany, in the circle of Auſtria, ſituated on the Alps, which divides Italy from Germany, and ſometimes reckoned part of Italy; it is bounded by Tyrol on the north, by the territory of Venice on the eaſt and ſouth, and by the country of the Griſons on the weſt, being ſeventy

miles long and fifty broad, ſubject to the houſe of Auſtria. Trent city, the capital of this biſhopric, is ſituated in eaſt long. 11°, north lat. 56° 5′. Here the famous council of Trent was held, which continued, with ſome intermiſſions, from the year 1545 to the year 1563, where the doctrine of the pope's infallibility, tranſubſtantiation, *&c.* were confirmed.

TRENT is alſo the name of one of the largeſt rivers in Great Britain, riſing in the moor-lands of Staffordſhire, and running ſouth-eaſt by Newcaſtle under Line, divides that country almoſt into two equal parts; then entering Darbyſhire, turns about to the north-eaſt; and having run the whole length of Nottinghamſhire, continues its courſe due north, at laſt joining the river Ouſe, and ſeveral others, it changes its name to that of Humber, and falls into the German-ſea below Hull.

TRENTAL, or TRIGINTAL, a romiſh office for the dead, conſiſting of thirty maſſes rehearſed for thirty days ſucceſſively after the party's death. See the article MASS.

TREPAN, *terebra*, *modiolus*, *&c.* in ſurgery, an inſtrument uſed in trepanning. See the next article.

TREPANNING, in ſurgery, a perforation, or opening, made in the bones of the cranium. See SKULL.

This operation was performed by the antients, not only in fractures and depreſſions of the cranium, but alſo in thoſe other obſtinate diſorders of the head and brain, which could not be relieved by internal medicines and the uſe of iſſues upon the coronal ſuture; but the modern ſurgeons never uſe the trepan for internal diſorders of the head, though they ſeldom neglect it in fractures and depreſſions of the cranium. See FRACTURE, FISSURE, DEPRESSION, *&c.*

The trepan is therefore uſeful not only in theſe caſes, to elevate the depreſſed parts of a fractured bone in the cranium, but alſo to diſcharge the extravaſated blood through an aperture made by this inſtrument. See the articles CONTUSION, EXTRAVASATION, CONTRA-FISSURE, *&c.*

The leſs time there is loſt the better before the application of the trepan, but the operation itſelf muſt be conducted ſlowly and carefully; for it is extremely difficult, if not impoſſible, to take out a piece of the cranium by this inſtrument without injuring the ſubjacent dura mater, to which it is moſt intimately attached. For this reaſon Heiſter is induced to condemn the advice of thoſe who direct to trepan the cranium immediately upon every ſlight diſorder of it: he therefore adviſes firſt to try the uſe of other remedies, both external and internal, rather than immediately ſubject the patient to the trepan, before it is abſolutely neceſſary. In general, the place where the fiſſure appears will be the moſt convenient to apply the trepan, if nothing indicates the contrary; but in fractures it will be proper to trepan a little below the injured part, that the extravaſated blood may be more eaſily diſcharged. It muſt be next obſerved, that there are ſeveral places in the cranium which ought not to be in any caſe trepanned; ſuch as, 1. upon the ſutures, eſpecially the ſagittal ſuture; yet in caſes of urgent neceſſity, the trepan may be uſed upon the coronal ſutures, and ſometimes upon the others. 2. It is equally dangerous to trepan the cranium in the middle of the os frontis, eſpecially in that part which forms the fontanel. 3. The trepan muſt not be uſed upon any of the ſinuſes of the os frontis. 4. Nor ought it to be uſed where any large vein or artery ſpreads itſelf. 5. If the fractured part of the bone upon which you fix the trepan is looſe, or carious, you might then injure the brain by this inſtrument. 6. It will be improper to trepan in the lower parts, or baſis, of the cranium, which are inveſted with muſcles. 7. Laſtly, it will be improper to trepan upon the cruciform eminence of the os occipitale. Notwithſtanding theſe cautions, if a violent fracture ſhould happen in or near theſe parts, you ſhould trepan as near them as poſſible; and if the fracture has paſſed acroſs the ſutures, you muſt trepan within a finger's breadth of the ſuture on each ſide. Sometimes it is impoſſible to diſcover the particular part of the cranium which is injured, the patient in the mean time being affected with the moſt dangerous and urgent ſymptoms. In theſe caſes it will be neceſſary to trepan firſt on the right ſide, then on the left, afterwards upon the forehead, and laſtly upon the occiput, and ſo round till you meet with the ſeat of the diſorder.

After having pitched upon the part to be trepanned, your next buſineſs is to ſhave the ſcalp, and make an inciſion through the integuments to lay bare the cranium,

except

TREPANNING INSTRUMENTS

Fig. 6.

Fig. 5.

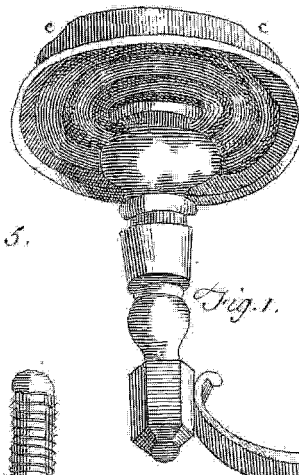


Fig. 1.

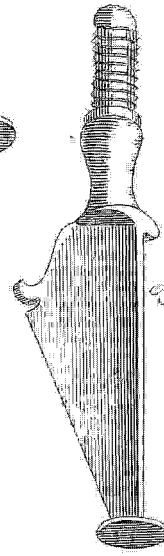


Fig. 4.

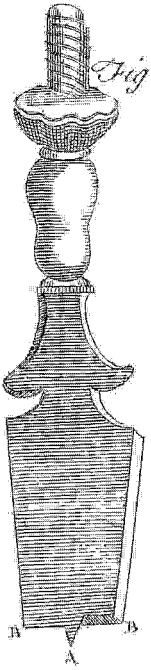


Fig. 7.

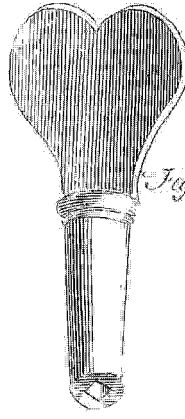


Fig. 3.

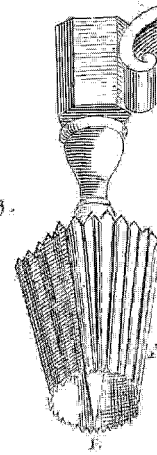
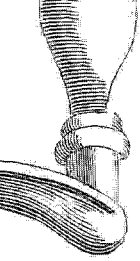


Fig. 2.



except it be done already by the wound. The inciſion of the integuments may be made in the form of a croſs, or of the letters X, V, or T, large enough to admit the crown of the trepan upon the bone. The wound may be enlarged, and the hæmorrhage ſtopped, after the integuments and periоſteum are ſeparated and elevated from the cranium, by inſerting a large quantity of ſcraped lint. Next a compreſs dipped in warm camphorated ſpirit of wine muſt be applied and retained by the kerchief bandage. Then the patient is to be left, if the diſorder will permit, for a few hours, that the blood may be ſtopped before the trepan is applied. Among the apparatus, or inſtruments and dreſſings, which muſt be provided before the operation is entered upon, the firſt and principal is the trepan with its crown, (pl. CCLXXXII. fig. 1.) made in the ſhape of a common gimblet with a handle turning round. The crown of this inſtrument, marked A, is joined to the lower part of the handle, B, by a ſcrew, ſo that it may be taken off and put on at pleaſure, or elſe that a crown of another ſize may be ſcrewed in its place. The trepan is diſtinguiſhed into male and female; in the firſt of which the crown is furniſhed with a ſharp point E, but when the ſaid point, or pyramid, fig. 2. is taken out by the winch, fig. 3. the trepan is then termed female. You muſt alſo be provided with a ſcalpel of a particular make, with a round and flat head, as repreſented in fig. 4. which is denominated the lenticular ſcalpel; to which is added another inſtrument for gradually depreſſing the dura mater, of the ſhape repreſented in fig. 5. There muſt be alſo a perforating inſtrument provided, fig. 6. which muſt be ſcrewed into the cavity B of the handle, fig. 1. alſo a hair-bruſh and an elevatory. See the article ELEVATORY.

The apparatus of dreſſing and bandage, to be applied after the operation, conſiſts of a doſſil of lint, of an orbicular figure, which muſt be tied round the middle with a piece of thread about a ſpan long; there muſt be pledgits of lint for covering the other dreſſings, and filling up the cavity of the cranium, *&c.*

The apparatus being thus provided, in order to perform the operation with greater readineſs and exactneſs, the patient muſt be diſpoſed in ſuch a convenient poſture that the ſurgeon and aſſiſtants may have free acceſs to perform each their part. Then the dreſſings being removed the wound is to be cleanſed; after which, the head being placed in a convenient manner upon a pillow, the ſurgeon takes the perforating trepan, fig. 6. and adapting it to the handle B, fig. 1. inſtead of the crown A, ſo that by turning round the handle D, he makes a full entrance, or aperture, with his inſtrument, and then applies the male trepan, with a crown A, fig. 1. Upon the top of the handle C C the ſurgeon fixes his left hand, upon which he places his chin or forehead, while with his right he ſlowly and carefully turns round the handle till the crown of the trepan with its ſpindle have made a circular entrance deep enough in the cranium, and then he removes the ſpindle, and continues his work with the crown of the trepan only as long as he ſees convenient; all the ſaw-duſt being firſt bruſhed off from the cranium, and the teeth of his inſtrument, with the bruſhes. He now continues to uſe the trepan till the ſaw-duſt becomes bloody, which denotes that he has penetrated the diploë: however, he may not always meet with this ſign, becauſe in ſome ſkulls the diploë may be wanting in the part trepanned; but when the ſaw-duſt becomes bloody the inſtrument is to be laid aſide: and after waſhing away the blood with a ſponge dipt in ſpirit of wine, he then ſcrews the elevatory, by two or three turns, into the ſmall aperture, in the middle of the trepanned piece of the bone, and takes it out again, making two or three more turns with the crown of his trepan: then he examines with a probe, whether the plates of the cranium are ſufficiently ſawed through, which cannot be better known than by attending to the colour of the circular groove; for when that appears blue or grey, it is a ſign that you have penetrated through the lower plate of the bone, ſo far as to render the dura mater almoſt conſpicuous through it; but if the bony plate appears livid in one part of the circular groove, and white in another, it is a ſign that the trepan has not cut equally through, and therefore it muſt be inclined and preſſed a little harder upon the whiteſt parts, moving round the handle till the ſaw-teeth of the crown have cut deep enough to make the round piece of the bone looſe or moveable. In that caſe it will not be convenient to cut totally through the bone with the ſaw-teeth of the trepan.

Having

Having thus extracted the round piece of the cranium, the blood uſually follows it: which being wiped off, the ſurgeon is to examine whether there be any fragments remaining to be extracted and looſened; for then you muſt ſmooth the rough parts about the lower margin of the aperture, by applying the ſcalpel, fig. 4. to prevent the dura mater from being pricked and injured by any of the ſharp ſplinters. This done, the blood will more readily diſcharge itſelf, but to promote its exit you may gently incline the patient's head to one ſide, and another tenderly preſſing the dura mater itſelf, either by the hand of the ſcalpel or the depreſſor, fig. 5, by which means the patient is no ſooner relieved from the preſſure of the extravaſated blood on his brain, but he inſtantly begins to recover his ſenſes: the ſurgeon ſhould then direct him to fetch a deep breath, or hold it with a ſtrain, like one that has a hard ſtool.

The dreſſings and deligation are to be made with a round pledgit of dry lint laid next the dura mater, with a thread faſtened to it, and hanging out of the aperture, that it may be placed under, and drawn out from beneath, the cranium; upon which pledgit is afterwards poured ſome honey of roſes diluted with a little ſpirit of wine: you then impoſe a like pledgit of lint, furniſhed with a ſtring with other doſſils, till the cavity is replete: and, in the next place, the cranium, and wound itſelf, is to be dreſſed with lint, ſpread with ſome digeſtive ointment, upon which add a ſquare compreſs dipt in warm ſpirit of wine, and then ſecure the whole, without a plaſter, by the head bandage. In the ſubſequent dreſſings, which muſt be repeated once or twice every day, you muſt avoid fat and oily applications. See the article WOUND.

The wound being conſtantly attended, you will have an exfoliation of a thin plate from the trepanned margin of the bones, uſually within forty or fifty days, which ought not to be pulled away by force. The exfoliation being obtained, there will appear new fleſh and callus ſhooting up from the clean bone and dura mater, ſo as at length to fill up the whole cavity.

That inſtrument called the exfoliating-trepan, is ſometimes uſed to pare away a carious part in a bone. It is repreſented in fig. 7, and when uſed is to be ſcrewed into the handle B of fig. 1, in order to be turned round: A is its point: B B the wings, which ſcrape the bone while the inſtrument is turning about. See the article CARIES.

TREPIDATION, in medicine, the ſame with tremor. See the article TREMOR.

TREPIDATION, in the antient aſtronomy, denotes what they called a libration of the eighth ſphere, or a motion which the ptolemaic ſyſtem attributed to the firmament, to account for certain almoſt inſenſible changes and motions obſerved in the axis of the world, by means whereof the latitudes of the fixed ſtars come to be gradually changed, and the ecliptic ſeems to approach reciprocally firſt towards one pole, then towards the other. This motion is called the motion of the firſt libration. See LIBRATION and TITUBATION.

TRESPASS, in law, ſignifies any tranſgreſſion of the law, under treaſon, felony, or miſpriſion of either; but it is moſt commonly uſed for any wrong or damage that is done by one private perſon to another, or to the king in his foreſt, *&c.*

In this ſenſe, treſpaſs is of two ſorts: treſpaſs general, which is called treſpaſs *vi et armis*; and treſpaſs ſpecial, or treſpaſs upon the caſe. Treſpaſſes againſt a man's perſon are ſuch as theſe, *viz.* threatning to hurt him, on aſſaulting or ſetting one to beat him; a battery, which is an actual beating or maiming a man ſo that he loſe the uſe of his limbs; an unlawful impriſonment of another, or illegally reſtraining him of his liberty, *&c.* See ASSAULT, BATTERY, *&c.*

Treſpaſſes committed againſt a man's property may be in ſeveral ways, as againſt his wife, children, or ſervants, or his houſe and goods, *&c.* or againſt his lands, by carrying away the deeds, or other evidences, concerning the ſame; cutting trees, or damaging the graſs therein. An action of treſpaſs, *vi et armis*, lies for a perſon who has the poſſeſſion of goods, or of a houſe, or land, if he be diſturbed in his poſſeſſion, for this reaſon, that ſuch diſturbance, beſides the private damage, is alſo a breach of the peace; and in caſe the defendant be convicted at common law, he is liable to be fined and impriſoned. The difference between this action and treſpaſs on the caſe is, that the one lies where the original act was a wrong in itſelf, and the other where it is conſequential

conſequential to a lawful act. A defendant in treſpaſs ſhall in no caſe be excuſed, unleſs it be upon an unavoidable neceſſity; therefore, where there is only a force in law, as if a perſon enters into another's land, he muſt be requeſted to go out before hands are laid on him, but it is otherwiſe when there is an actual force committed. The defendant in treſpaſs can, by his plea, put the plaintiff to a new aſſignment of the place where, *&c.*

TRESPASSER, denotes a perſon that commits a treſpaſs againſt another, in reſpect of whom it is held, that though the law permits a perſon to enter a tavern, and a landlord to diſtrain on lands, *&c.* yet if he abuſes this liberty by committing any treſpaſs, he will be judged a treſpaſſer *ab initio*.

TRESSURE, in heraldry, a diminutive of an orle, uſually held to be half the breadth thereof. See it repreſented in plate CCLXXXVIII. fig. 2.

TRET, in commerce, an allowance made for the waſte, or the dirt, that may be mixed with any commodity, which is always four pounds in every one hundred and four pounds weight. See TARE.

TREVES, or TRIERS. See TRIERS.

TREVI, a town of Italy, in the pope's territory and province of Umbria, ſituated twenty-three miles ſouth-eaſt of Perugia.

TREVIGIO, or TREVISO, a city of Italy, in the territory of Venice, capital of the province of Trevigiano, ſituated fifteen miles north-weſt of Venice.

TREVOUX, a town of France, in the province of Burgundy, and territory of Bourghen-Breſſe, ſituated on the river Saone, twenty-three miles ſouth-weſt of Bourg.

TREWIA, in botany, a genus of the *polyandria monogynia* claſs of plants, having no corolla beſides the cup: the fruit is a turbinated, triquetrous, coronated, trilocular, trivalvar capſule: the ſeed is ſingle, convex on one ſide, and angular on the other. See plate CCLXXXV. fig. 2.

TREZZO, a town of Italy, in the dutchy of Milan, ſituated on the river Adda, fifteen miles north-eaſt of Milan.

TRIA PRIMA, among chemiſts, the three hypoſtatical principles, *viz.* ſalt, ſulphur, and mercury; of which they hold all bodies to be primarily made, and into which they are all held reſolvable by fire.

TRIAL, in law, the examination of a cauſe, civil or criminal, according to the laws of the land, before a proper judge: or, it is the manner and order obſerved in the hearing and determining of cauſes. There are divers kinds of trials; as thoſe of matters of fact, which muſt be tried by a jury; matters of law, which are only triable by the courts; and matters of record, which are to be tried by the records themſelves. The moſt general rule has been, that the jurymen on a trial ſhall be choſen out of that town or precinct, *&c.* in which the matter of fact is alledged, or the neareſt thereto, for the better cognizance of the matter, and not to leave things to be tried in foreign countries, where the jury are ſtrangers to the whole matter. Where any trial is for murder, it muſt be in the county wherein the fact was committed; but if the aſſault be in one county, and the perſon aſſaulted happens to die in another county, the indictment may be found by a jury of the county where the party died: and by ſpecial commiſſion, when a perſon is indicted in one county he may be tried in another. In all criminal caſes the cuſtom is to aſk the priſoner how he will be tried, which was formerly a very ſignificant queſtion, though it is not ſo now, becauſe anticently there were trials by combat, by ordeal, and by jury; and when the priſoner anſwered, by God and his country, it appeared he made choice to be tried by a jury; which is the only way now uſed for the trial of criminals. See the articles COMBAT, MURDER, *&c.*

The method of proceeding in criminal caſes is this: firſt the bill of indictment againſt the offender is prepared, and the proſecutor and his witneſſes attend on the grand-jury therewith, and there give in their evidence; which being done, the grand inqueſt either find the bill of indictment, or bring it in ignoramus; and if the bill be found, the priſoner is brought to the bar of the court, and the clerk of the arraignment calling him by his name, deſires him to hold up his hand, ſaying, "Thou art indicted by the name of — —, for ſuch a felony, *&c.* (ſetting forth the crime laid in the indictment) How ſayeſt thou, art thou guilty of this felony whereof thou art indicted, or not guilty?" To which the priſoner anſwering, "Not guilty," the clerk ſays, "Culprit, how wilt thou be

tried?"

tried?" whereupon the defendant anſwers, "By God and my country;" which plea of the priſoner the clerk records, and then the panel of the petty-jury is called over. See IGNORAMUS, CULPRIT, JURY, *&c.*

After the jury are ſworn, and the indictment is read over to them, and they are charged, the evidences on both ſides, for and againſt the priſoner, are called, ſworn, and examined in open court; after which the jury bring in their verdict; and if they find the priſoner guilty, their verdict is recorded, and the priſoner is taken from the bar: but if they bring him in not guilty, the priſoner is bid to fall down on his knees, *&c.* On the priſoners being brought in guilty, proclamation is made for all perſons to keep ſilence, upon which the priſoner is again brought to the bar, and the verdict repeated: after which ſentence is paſſed on him, and an order, or warrant, is made for his execution. See the articles FELONY, WARRANT, *&c.*

The methods of trial, in our civil courts, are as follows: *viz.* The declaration is firſt drawn for the plaintiff, and when the appearance of the defendant is entered, it has been uſual to deliver it with an imparlance to the defendant's attorney; and the term following rule is to be given with the ſecondary for the defendant to plead by ſuch a day, or elſe the plaintiff is to have judgment: and the defendant having pleaded, a copy of the iſſue is made by the plaintiff, and delivered to the defendant's attorney, at the ſame time giving him notice of the trial; in order to which the *venire facias* muſt be taken out and returned by the ſheriff; and likewiſe the *habeas corpora*, or *diſtringas*, to bring in the jury; on which the record is made up, and the parties proceed to trial by their council and witneſſes, and the jury give in their verdict, *&c.* But in caſe the defendant neglects to plead, and ſuffers it to go by default, on entering ſuch a judgment, a writ of inquiry of damages is awarded returnable next term; notice of the execution whereof the defendant's attorney is to have, and which being executed, and the damages inſerted in a ſchedule annexed to the writ, a rule is given thereon, and coſts are taxed by the prothonotary, *&c.* See the articles DECLARATION, IMPARLANCE, *&c.*

TRIANDRIA, in the linnæan ſyſtem of botany, a claſs of plants, the third in order; comprehending all ſuch plants as have hermaphrodite flowers, with three ſtamina, or male parts, in each; whence the name.

To this claſs belong the tamarind, valerian, ſaffron, gladiol, iris, *&c.* See the article TAMARIND, *&c.*

TRIANGLE, in geometry, a figure of three ſides and three angles.

Triangles are either plane or ſpherical. A plane triangle is contained under three right lines; and a ſpherical one is a triangle contained under three arches of great circles of the ſphere. See the article SPHERE.

Triangles are denominated, from their angles, right, obtuſe, and acute. A right-angled triangle is that which has one right angle, as ABC, pl. CCLXXXIII. fig. 1. n° 1. An obtuſe-angled triangle is ſuch as has one obtuſe angle; as DEF; *ibid.* n° 2. And an acute-angled triangle is that which has all its angles acute; as *ghi*, GHI, *ibid.* n° 3 and 4. See the article ANGLE.

And here it may not be improper to explain other diſtinctions of triangles. Any triangle that is not right-angled, is called oblique-angled, or amblygonial. An equilateral-triangle is that which has all its ſides equal; as *ghi*, *ibid.* n° 3. An iſoſceles-triangle is one that has only two ſides equal; as GHI, *ibid.* n° 4. And a ſcalenous-triangle is one that has no two ſides equal; as DEF, *ibid.* n° 2.

In every triangle the ſines of the ſides are proportional to the ſines of the oppoſite angles; alſo the ſine of all the three angles is equal to two right ones; and the external angle, made by any ſide produced, is equal to the ſum of the two internal and oppoſite angles: thus ∠*e*ED, (*ibid.* n° 2.) = ∠EFD + FDE. Triangles on the ſame baſe, and having the ſame height, or place, between the ſame parallels, are equal: alſo triangles on equal baſes, and between the ſame parallels, are equal. If a perpendicular be let fall upon the baſe of an oblique-angled triangle, the difference of the ſquares of the ſides is equal to the double-rectangle under the baſe, and the diſtance of the perpendicular from the middle of the baſe. The ſide of an equilateral-triangle, inſcribed in a circle, is in power triple of the radius. The ſides of a triangle are cut proportionably, by a line drawn parallel to its baſe. A whole triangle is to a triangle cut off by a right

line drawn parallel to the baſe, as the rectangle under the cut ſides is to the rectangle of the two other ſides. In a right-angled triangle, a line drawn from the right-angle at the top, perpendicular to the hypothenuſe, divides the triangle into two other right angled triangles, which are ſimilar to the firſt triangle, and to one another. In every right-angled triangle, the ſquare of the hypothenuſe is equal to the ſum of the ſquares of the other two ſides; that is, AC^2 (*ibid.* n° 1.) $= AB^2 + BC^2$.

If any angle of a triangle be biſſected, the biſſecting-line will divide the oppoſite ſide in the ſame proportion as the legs of the angle are to one another.

Every triangle is one half of a parallelogram of the ſame baſe and height.

The area of any triangle may be had by adding all the three ſides together, and taking half the ſum, and from that half ſum ſubtracting each ſide ſeverally, and multiplying that half ſum and the remainder continually into one another, and extracting the ſquare root of the product.

For the ſolving the ſeveral caſes of plane and ſpherical triangles, ſee the article TRIGONOMETRY.

TRIANGULAR *Compaſſes*, are ſuch as have three legs, or feet, whereby to take off any triangle at once; much uſed in the conſtruction of maps, globes, *&c.*

TRIANGULAR *Numbers*, are a kind of polygonal numbers, being the ſums of arithmetical progreſſions, the difference of whoſe terms is 1.

Thus of arithmetical progreſſion, 1 2 3 4 5 6, are formed triangular numbers 1 3 6 10 15 21.

TRIANGULAR *Canon*, the tables of artificial ſines, tangents, ſecants, *&c.*

TRIANGULAR *Quadrant*, is a ſector furniſhed with a looſe piece, whereby to make it an equilateral triangle.

The calendar is graduated thereon, with the ſun's place, declination, and other uſeful lines; and by the help of a ſtring and a plummet, and the diviſions graduated on the looſe piece, it may be made to ſerve for a quadrant.

TRIANGULARIS, in anatomy, a name given to two muſcles of the lips, which ariſe each from the lateral and under part of the lower jaw; from whence they aſcend obliquely to the angle of the orbicularis.

There is alſo a muſcle of the breaſt called triangularis ſterni, which riſes from the lower and interior part of the ſternum, and is inſerted on each ſide into the cartilages of the fourth, fifth, ſixth, and ſeventh true ribs: it is one of the conſtrictor or depreſſor muſcles of the breaſt.

One of the dilatator muſcles of the urethra is alſo called triangularis from its figure: it riſes from the anterior part of the ſphincter of the anus, and is inſerted into the poſterior and lower parts of the accelerators, or elſe into the bulb of the urethra.

TRIARII, in the roman militia, a kind of infantry armed with a pike, a ſhield, a helmet, and a cuiraſs; thus called becauſe they made the third line of battle.

TRIAS HARMONICA, or *the harmonical* TRIAD, in muſic, a compound of three radical ſounds, heard all together, two whereof are a fifth and third above the other, which is a fundamental.

TRIBE, *tribus*, in antiquity, a certain quantity or number of perſons, when a diviſion is made of a city or people into quarters or diſtricts.

The tribes of antient Rome bore a great reſemblance to our wards. See the article WARD.

TRIBRACHYS, in antient poetry, a foot conſiſting of three ſyllables, and thoſe all ſhort; as *melius*.

TRIBULASTRUM, a plant otherwiſe called neurada. See NEURADA.

TRIBULOIDES, in botany, the ſame with trapa. See TRAPA.

TRIBULUS, CALTROP, in botany, a genus of the *decandria-monogynia* claſs of plants, the corolla of which conſiſts of five oblong, obtuſe, and patent petals: its fruit is of a roundiſh figure and aculeated, being compoſed of five capſules, gibbous on one ſide, and armed with three or four points on the other, angulated and convergent; and containing numerous ſeeds, turbinated and oblong.

TRIBUNAL, in general, denotes the ſeat of a judge, called in our courts bench. See the article BENCH.

The word is latin, and takes its origin from the ſeat where the tribune of the roman people was placed to adminiſter juſtice.

The name tribunal was alſo given to the place from whence the people of antient Rome were harangued.

TRIBUNE, *tribunus plebis*, among the antient Romans, a magiſtrate choſen out of the commons, to protect them againſt

the oppreſſions of the great, and to defend the liberty of the people againſt the attempts of the ſenate and conſuls.

The tribunes of the people were firſt eſtabliſhed in the year of Rome 259. The firſt deſign of the creation was to ſhelter the people from the cruelty of uſurers, and to engage them to quit the Aventine mount, whither they had retired in diſpleaſure.

Their number, at firſt, was but two; but the next year, under the conſulate of A. Poſthumus Aruncius and Caſſius Viſcellinus, there were three more added; and this number of five was afterwards increaſed, by L. Trebonius, to ten. The appellation, tribune, was given them, by reaſon they were at firſt choſen out of the tribunes of the army.

Military TRIBUNE, *tribunus militum*, or *militaris*, an officer in the Roman army, who commanded in chief over a body of forces, particularly the diviſion of a legion, much the ſame with our colonel, or the french meſtre de camp.

TRIBUNE was alſo an appellation given to various other officers; as the tribuni ærarii, tribunes of the treaſury. Tribune of the celeres, the officer who commanded them. Tribuni fabricarum, thoſe who had the direction of the making of arms. Tribuni marinorum, tribuni nolanorum, tribuni voluptatum, mentioned in the Theodoſian Code, as intendants of the public ſhews, and other diverſions. The title of tribune, tribunus, was alſo given to the chief of each tribe.

TRIBUTARY, *tributarius*, one who pays tribute to another, in order to live in peace with him, or ſhare in his protection.

TRIBUTE, *tributum*, a tax or impoſt which one prince or ſtate is obliged to pay to another as a token of dependence, or in virtue of a treaty, and as a purchaſe of peace.

The Romans made all the nations they ſubdued pay them tribute. Mahomet laid it down as a fundamental of all his law, that all the world ſhould pay him tribute. In the ſtates of the grand ſeignior chriſtian children are taken by way of tribute. See the article AGEMÖGLANS.

Tribute is ſometimes alſo uſed for a perſonal contribution, which princes lay upon their ſubjects, by way of poll-money.

TRICEPS, in anatomy, the abductor-muſcle of the thigh, having three heads, and as many inſertions: the firſt and ſecond heads of this muſcle ariſe from the os pubis, near the ſynchondroſis; the third, from the tubercle of the iſchium; and it is inſerted into the whole ſpine of the os femoris.

TRICHECUS, or THRICHECHUS. See the article THRICHECHUS.

TRICHERIÆ, a genus of foſſils, naturally and eſſentially ſimple, not inflammable nor ſoluble in water; being fibroſe bodies, not elaſtic, and compoſed of ſtraight and continuous filaments. See the article FIBRARIÆ.

To this genus belongs the gypſum ſtriatum of authors, with ſeveral other ſpecies. See the article GYPSUM.

TRICHIASIS, in ſurgery, an inverſion of the eye-lids, whereby the eye laſhes hurt the eyes.

According to Heiſter, this diſorder is very difficultly remedied; ſince it is hardly poſſible to remove it, ſo as to prevent its returning, without extirpating the offending hairs; and if theſe be cut off cloſe, it will be to no purpoſe, becauſe the rigid ſtumps of the hairs will irritate the eye even worſe than the whole hairs did before. It is a very nice operation alone that can make a cure; here the hairs muſt be pulled up ſingly by the roots, and the places of their inſertion ſingly cauterized with a hot broad pointed needle; but this the patient will ſeldom ſubmit to, and the only remaining method then, is to fill up the ſinus's out of which they were extracted with the lapis infernalis. But in this the greateſt care muſt be taken, that no part of that application get into the eye. The eaſieſt method is the touching the cavities, out of which the hairs have been pulled up, with a pencil-bruſh dipped in a mixture of ſpirit of ſal-armoniac and highly rectified ſpirit of wine, by which means they will cloſe up, and no more hairs will grow from them.

TRICHOMANES, in botany, a genus of the *cryptogamia* claſs of plants, in which there appears a turbinated erect calyx, ſtanding ſingly on the very margin of the leaf, and a ſetaceous ſtyle terminating the capſule.

Trichomanes, or engliſh black maiden-hair, is recommended in diſorders of the breaſt, proceeding from a thickneſs and acrimony of the juices; being uſually directed in infuſion, or decoction, with the addition of a little liquorice: a ſyrup made

made of it frequently ſupplies the place of that made from the adiantum verum. See the article ADIANTUM.

TRICHOSANTHES, in botany, a genus of the *monoecia ſyngeneſia* claſs of plants, the corolla of which is monopetalous, divided into five ſegments, and is ciliated: the ſtamina are three very ſhort filaments: the fruit is an oblong apple. This genus comprehends the anguina of Micheli.

TRICHOSTEMA, in botany, a genus of the *didynamia gymnoſpermia* claſs of plants, with a monopetalous ringent and falcated flower: the ſtamina are four extremely long filaments; and four roundiſh ſeeds are contained in the cup.

TRICUSPIDES VALVÆ, in anatomy, a name given to the mitral valves, placed at the juncture of the right auricle and ventricle of the heart. See HEART.

TRIDAX, in botany, a genus of the *ſyngeneſia-polygamia ſuperflua* claſs of plants, with a radiated flower, and the leſſer hermaphrodite ones of the diſc monopetalous, and funnel-faſhioned: the ſeeds are winged with down, and contained in the cup.

TRIDENT, *tridens*, an attribute of Neptune, being a kind of ſceptre which the painters and poets put into the hands of that god, in form of a ſpear, or fork, with three teeth; whence the word.

TRIDENT, among mathematicians, is uſed for a kind of parabola, by which Des Cartes conſtructed equations of ſix dimenſions.

TRIEMIMERIS, a kind of cæſura in latin verſe, wherein after the firſt foot of the verſe there remains an odd ſyllable, which helps to make up the next foot.

TRIENNIAL, an epithet applied chiefly to offices or employments which laſt for three years.

TRIENS, in antiquity, a copper money of the value of one-third of an as, which on one ſide bore a Janus's head, and on the other a water-rat.

This was the piece of money uſed to be put in the mouths of the deceaſed to pay Charon his fare, for their paſſage into another life.

TRIENTALIS, in botany, a genus of the *heptandria-monogynia* claſs of plants, with a ſtellated monopetalous flower: its fruit is a dry, globoſe and unilocular berry, containing a few angulated ſeeds.

TRIERS, or TREVES, the capital of the electorate of Triers, in Germany, ſituated on the river Moſelle, ſixty miles ſouth of Cologn: eaſt long. 6° 10′, north lat. 49° 55′.

TRIESTE, a port-town of Iſtria, ſituated on the gulph of Venice, ſixty miles north-eaſt of that city.

TRIFOLIUM, TREFOIL, in botany. See the article TREFOIL.

TRIGA, in antiquity, denotes a kind of carr, or chariot, drawn by three horſes; whence the name.

TRIGAMY, a third marriage, or the ſtate of a perſon who has been married three times. See MARRIAGE.

TRIGLA, in ichthyology, a genus of fiſhes, of the order of the acanthopterigii, the characters of which, according to Artedi, are theſe: the branchioſtege membrane contains ſeveral bones; the head is very declivious, from the eyes to the end of the ſnout, and is large, aculeated, and as it were ſquare; the head is the broadeſt part of the fiſh; it thence grows gradually narrower, till it ends in a very ſmall tail: in many of the ſpecies of this fiſh, there are two or three articulated appendices growing under the pectoral fins: the eyes ſtand on the top of the head, and are covered with a ſkin; there are two back fins, the firſt of which is prickly; the pectoral fins in ſome of the ſpecies are very large.

This genus comprehends the mullet, hirundo piſcis, tub-fiſh, gurnard, *&c.* See the article MULLET, *&c.*

TRIGLOCHIN, in botany, a genus of graſſes, belonging to the *hexandria-trigynia* claſs of plants, the flower of which conſiſts of three oval, concave, and obtuſe petals; and its fruit is an oblong capſule of an oval figure, with three cells, in each of which is a ſingle oblong ſeed.

TRIGLYPHS, in architecture, a ſort of ornaments repeated at equal intervals in the doric freeze. See DORIC and FREEZE.

Each triglyph conſiſts of two entire gutters, or channels, cut to a right angle, called glyphes, and ſeparated by three interſtices, called, by Vitruvius, femora, from each other, as well as from two other half channels which are at the ſides.

The ordinary proportion of triglyphs is to be a module broad, and one and a half high. But this proportion, M. le Clerc obſerves, ſometimes occaſions ill-proportioned intercolumnations in porticos; for which reaſon he chuſes to ac-

commodate the proportion of his triglyphs to that of the intercolumns.

TRIGON, τριγωνον, a triangle. See the article TRIANGLE.

In aſtrology, trigon denotes the ſame with trine. See TRINE.

TRIGONELLA, in botany, a genus of the *diadelphia-decandria* claſs of plants, with a papilionaceous tetrapetalous flower: the fruit is an oblong, oval pod, of a compreſſed figure, and containing ſeveral roundiſh ſeeds.

TRIGONOMETRY, that part of geometry, which teaches how to meaſure the ſides and angles of triangles. See the article TRIANGLE.

Trigonometry is either plane or ſpherical, according as the triangles are plane or ſpherical; of each whereof we ſhall treat in order.

Plane TRIGONOMETRY, or that which teaches the menſuration of plane triangles, is commonly divided into rectangular and oblique-angular.

I. And firſt of rectangular plane trigonometry: if in any right-angled triangle, ABC (plate CCLXXXIII. fig. 2. n° 1.) the hypothenuſe be made the radius, and with that a circle be deſcribed on the one end, A, as a center; then, it is plain, that BC will be the ſine of the angle BAC; and if with the ſame diſtance, and on the end B as a center, a circle be deſcribed it is plain that AC will be the ſine of the angle ABC; therefore, in general, if the hypothenuſe of a right angled triangle be made the radius, the two legs will be the ſines of their oppoſite angles. See SINE, RADIUS, &c.

Again, if in a right-angled triangle DEF (*ibid.* n° 2.) one of the legs, as DF, be made the radius, and on the extremity D (at one of the oblique angles, *viz.* that which is formed by the hypothenuſe and the leg made radius) as a center, a circle be deſcribed; it is plain that the other leg, EF, will be the tangent of the angle at D, and the hypothenuſe DE will be the ſecant of the ſame angle. The ſame way, making the leg EF the radius, and on the center E deſcribing a circle, the other leg DF will become the tangent of the angle at E, and the hypothenuſe DE the ſecant of the ſame. See TANGENT and SECANT.

The chord, ſine, tangent, &c. of any arch, or angle, in one circle, is proportionable to the chord, ſine, tangent, &c. of the ſame arch in any other circle; from which, and what has been ſaid above, the ſolutions of the ſeveral caſes of rectangular trigonometry naturally follow. See CHORD, ARCH, &c.

Since trigonometry conſiſts in determining angles and ſides from others given, there ariſes various caſes; which being ſeven in rectangular-trigonometry, are as follows.

Caſe I. The angles, and one of the legs, of a right-angled triangle be given, to find the other leg.

Example. In the triangle ABC (*ibid.* n° 3.) right-angled at B, ſuppoſe the leg AB = 86 equal parts; as feet, yards, miles, &c. and the angle A = 33° 40′; required the other leg BC, in the ſame parts with AB.

1. Geometrically: Draw AB = 86, from any line of equal parts; upon the point B, erect the perpendicular BC; and, laſtly, from the point A, draw the line AC, making with AB an angle of 33° 40′; and that line produced will meet BC in C, and ſo conſtitute the triangle. The length of BC may be found by taking it in your compaſſes, and applying it to the ſame line of equal parts that AB was taken from.

2. By calculation: Firſt, by making the hypothenuſe AC radius, the other two legs will be the ſines of their oppoſite angles, *viz.* AB the ſine of C, and CB the ſine of A. Now ſince the ſine, tangent, &c. of any arch in one circle is proportionable to the ſine, tangent, &c. of the ſame arch in any other circle, it is plain the ſines of the angles A and C in the circle deſcribed by the radius AC, muſt be proportional to the ſine of the ſame arches or angles, in the circle, that the table of artificial ſines, &c. was calculated for; ſo the proportion for finding BC will be

S, C : AB :: S, A : BC.

i. e. As the ſine of the angle C in the tables, is to the length of AB (or ſine of C in the circle whoſe radius is AC) ſo is the ſine of the angle A in the tables, to the length of BC (or ſine of the ſame angle in the circle whoſe radius is AC). Now the angle A being 33°, 40′, the angle C muſt be 56°, 20′; therefore looking in the table of artificial ſines, &c. for the ſines of the two angles, and in the table of logarithms for the logarithm of 86 the given leg, we ſhall find by proceeding according to the foregoing proportion, that the required leg BC, is

57.28;

Fig. 1. Triangles

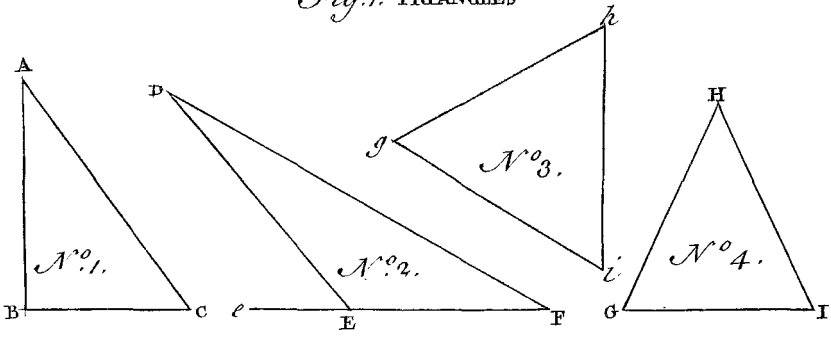
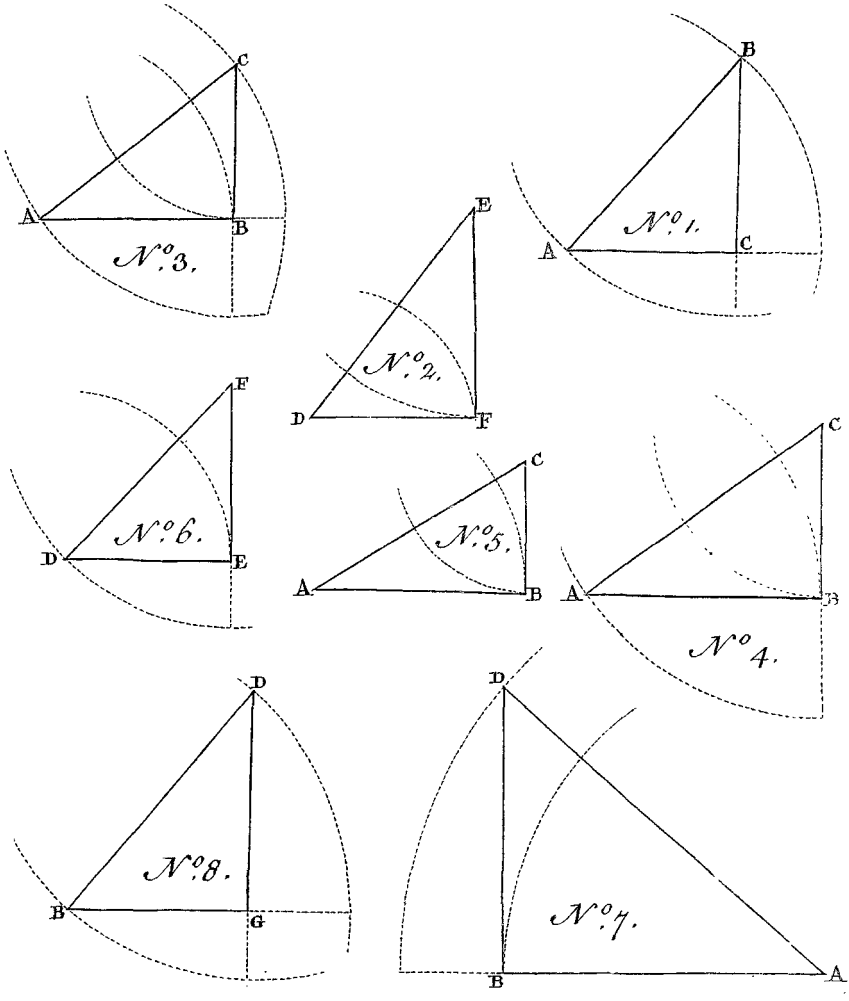


Fig. 2. Rectangular Trigonometry



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57.28; and the operation will ſtand as follows:

1.93450	A B	86
9.74380	S, A	33°, 40′
11.67830		
9.92027	S, C	56°, 20′
1.75803	B C	57.28

Secondly, Making A B the radius, it is plain B C, the leg required, will be the tangent of the given angle A, and ſo the proportion for finding B C, when A B is made the radius, will be:

R T, A . . A B : B C

i. e. as the radius in the tables, is to the tangent of the angle A in the ſame, ſo the length of B A, or radius in the ſcheme, to the length of B C or tangent of A in the ſcheme; therefore looking in the tables for the parts given in the foregoing proportion, and proceeding with them according to that rule, we ſhall find B C to be 57.28 as before, and the operation will be as follows:

9.82352	T, A	33°, 40′
1.93450	A B	86
11.75802		
10.00000	Rad.	90°
1.75802	B C	57.28

Laſtly, by making B C, the leg required, the radius, it is plain that A B will be the tangent of C, and the proportion for finding B C will be as follows:

T, C : R . : A B : B C

i. e. as the tangent of C	56°, 20′	10.17648
is to radius	90°	10.00000
ſo is the length of A B	86	1.93450
		11.93450
		10.17648
to the length of B C	57.28	1.75802

Caſe II. The angles and one of the legs given, to find the hypothenuſe.

Example: In the triangle A B C, (*ibid.* n° 4.) ſuppoſe A B 124, and the angle A 34°, 20′; conſequently the angle C 55°, 40′ required the hypothenuſe A C, in the ſame parts with A B.

1. Geometrically: this caſe is conſtructed after the ſame manner with the former; and the hypothenuſe, A C, is found, by taking its length in your compaſſes, and applying that to the ſame line of equal parts from which A B was taken.

2. By calculation: firſt, making A C the radius, we ſhall have the following proportion for finding A C, *viz.*

S, C . R : : A B . A C.

i. e. as the ſine of C	55° 40′	9.91686
is to radius -	90°	10.00000
ſo is A B	124	2.09342
to A C	150.2	2.17656

Secondly, making A B the radius, we have this proportion, *viz.*

R: ſec. A: : A B: A C.

i. e. as the radius	90°	10.00000
to the ſecant of A	34° 20′	10.08314
ſo is A B	124	2.09342
to A C -	150.2	2.17656

This may alſo be done, without the help of the ſecants; for ſince R. ſec. : : Co-S. : R; therefore, the former proportion will become,

Co - S, A : R : : A B : A C.

i. e. as the co-ſine of A	34°, 20′	9.91686
is to the radius	90°	10.00000
ſo is A B	124	2.09342
to A C	150.2	2.17656

Thirdly, Making B C the radius, we have the following proportion, *viz.*

T, C : Sec. C : : A B : A C.

i. e. as the tangent of C	55°, 40′	10.16558
is to ſec. C	55°, 40′	10.24872
ſo is A B -	124	2.09342
to A C	150.2	2.17656

This likewiſe may be done without the help of ſecants; for ſince T, : Sec. : S, : R; therefore the former analogy will be reduced to this, *viz.*

S, C : R : A B : A C

where no ſecants do appear, and it coincides with that in the firſt ſuppoſition of this caſe, ſo we ſhall not repeat the operation.

Caſe III. The angles and hypothenuſe given, to find either of the legs.

Example: In the triangle A B C, (*ibid.* n° 4.) ſuppoſe the hypothenuſe A C = 146, and the angle A = 36° 25′; conſequently the angle C = 53° 35′; required the leg A B.

1. Geometrically: draw the line A B at pleaſure, and make the angle B A C equal to 36°, 25′; then take A C equal to 146 from any line equal parts; laſtly, from the point C, let fall the perpendicular C B, on the line A B. So the the triangle is conſtructed, and A B may be meaſured from the line of equal parts.

2. By calculation: firſt, making A C the radius, we ſhall have the following proportion, *viz.*

R : S, C : : A C : A B.

i. e. As radius	90°	10.00000
to the ſine of C	53° 35′	9.90565
ſo is A C	146	2.16435
to A B	117.5	2.07000

Secondly,

Secondly, making A B the radius, we have the following analogy, *viz.*

Sec. A : R : : A C : A B.

i. e. As the secant of A	36° 25′	10.09435
is to radius	90°	10.00000
ſo is A C	146	2.16435
to A B	117.5	2.07000

This may alſo be done without the help of ſecants; for ſince ſec. . R : : R : Co. S, the former proportion may be reduced to this, *viz.*

R : Co-S, A : : A C : A B,

which is the ſame with the proportion in the firſt ſuppoſition.

Thirdly, By ſuppoſing B C the radius, we have the following proportion, *viz.*

Sec. C : T, C : : A C : A B,

i. e. as the ſecant of C	53°, 35′	10.22647
is to the tangent of C	53°, 35′	10.13212
ſo is A C	146	2.16435
to A B	117.5	2.07000

Caſe IV. The two legs being given, to find the angles.

Example: In the triangle A B C, (*ibid.* n° 5.) ſuppoſe A B 94 and B C 56, required the angles A and C.

1. Geometrically: draw A B equal to 94, from any line of equal parts, then from the point B raiſe B C perpendicular to A B, and take B C, from the former line of equal parts equal to 56; laſtly, join the points A and C with the ſtreight line A C, ſo the triangle is conſtructed, and the angles may be meaſured by a line of chords. See SCALE and SECTOR.

2. By calculation: firſt, ſuppoſing A B the radius, we have this analogy, *viz.*

A B : B C : : R : T, A,

i. e. as A B	94	1.97313
is to B C	56	1.74819
ſo is the radius	90°	10.00000
to the tangent of A	30°, 47′	9.77506

Secondly, making B C the radius, we have this proportion, *viz.*

B C : B A : : R : T, C.

i. e. as B C	56	1.74819
is to A B	94	1.97313
ſo is the radius	90°	10.00000
to the tangent of C	59° 13′	10.22494

Caſe V. The hypothenuſe and one of the legs given, to find the angles.

Example: In the triangle D E F, (*ibid.* n° 6.) ſuppoſe the leg D E = 83, and the hypothenuſe D F = 126; required the angles D and F.

1. Geometrically: draw the line D E = 83, from any line of equal parts; and, from the point E, raiſe the perpendicular E F: then take the length of D F = 126, from the ſame line of equal parts; and ſetting one foot of your compaſſes in D, with the other croſs the perpendicular E F in E: Laſtly, join D and F; and the triangle being thus conſtructed, the angles may be meaſured by a line of chords.

2. By calculation: firſt, making D F the radius, we ſhall have this proportion, *viz.* D F : D E : : R : S, F.

i. e. as D F	126	2.10037
is to D E	83	1.91908
ſo is radius	90°	10.00000
to the ſine of F	41° 12′	9.81871

Secondly, by ſuppoſing D E the radius, we have the following analogy, *viz.*

D E : D F : R : Sec. D.

i. e. as D E	83	1.91908
is to D F	126	2.10037
ſo is radius	90°	10.00000
to the ſecant of D	48° 48′	10.18129

This may be done without the help of ſecants; for ſince R : ſec. : : Co-S, : R, the foregoing analogy will become this, *viz.* D F : D E : R : Co-S, D, which gives the ſame anſwer, with that deduced from the firſt ſuppoſition.

Caſe VI. The two legs being given, to find the hypothenuſe.

Example: In the triangle A B D, (*ibid.* n° 7.) ſuppoſe the leg A B = 64, and B D = 56: required the hypothenuſe.

1. Geometrically: the conſtruction of this caſe is performed the ſame way as in the fourth caſe, and the length of the the hypothenuſe is found by taking it in your compaſſes, and applying it to the ſame line of equal parts, that the two legs were taken from.

2. By calculation: this caſe being a compound of the fourth and ſecond caſes, we muſt firſt find the angles by the fourth, thus:

A B . D B : R : T, A.

i. e. as the leg A B	64	1.80618
is to the leg D B	56	1.74819
ſo is the radius	90	10.00000
to the tangent of A	41° 11′	9.94201

Then by the ſecond caſe we find the hypothenuſe required thus:

S, A : R : : B D A D,

i. e. as the ſine of A	41°. 11′	9.81854
is to the radius	90°	10.00000
ſo is the leg B D	56	1.74819
to the hypothe. A D	85.05	1.92965

This caſe may alſo be ſolved after the following manner, *viz.*

From twice the log. of the greater ſide A B	3.61236
ſubtract the log. of the leſſer ſide B D	1.74819
and there remains	1.86417

the

Fig. 1 Oblique-angled TRIGONOMETRY

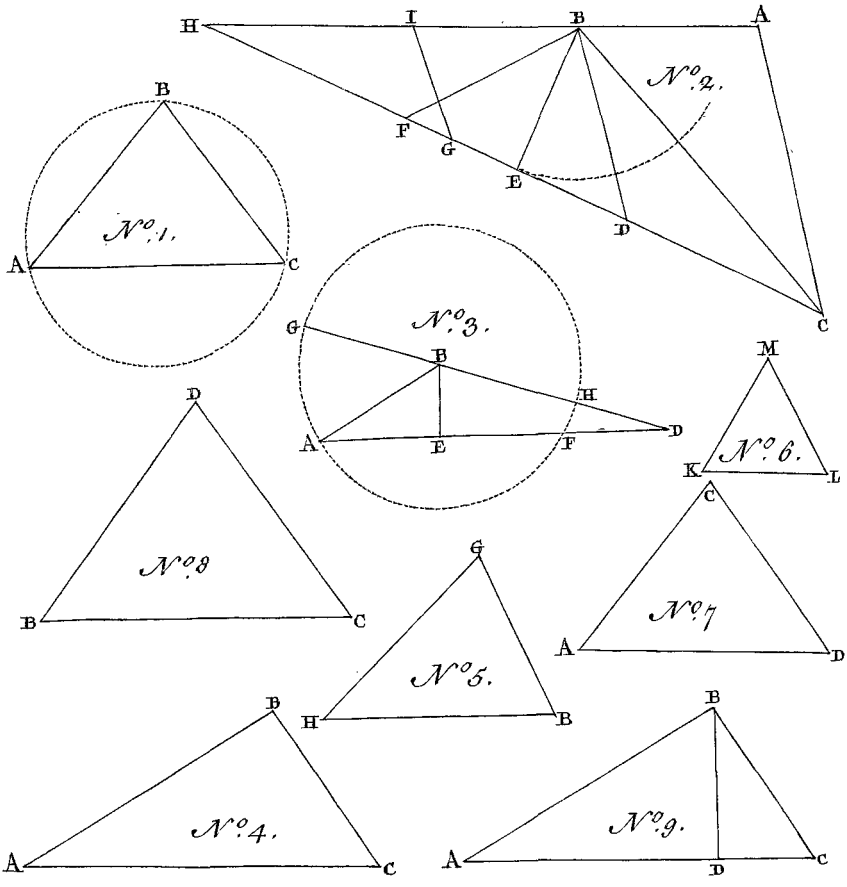
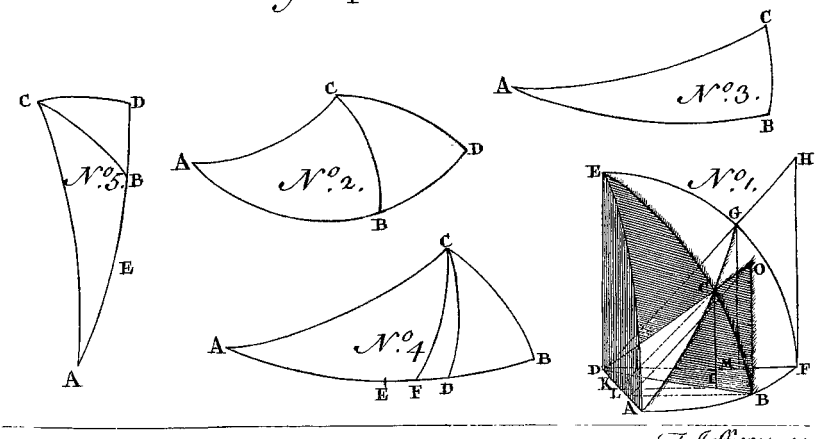


Fig. 2. Spherical TRIGONOMETRY



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the logarithm of 73.15; to which adding the leſſer ſide B D, we ſhall have 189.15 whoſe log. is - 2.11093
to which add the log. of the leſſer ſide B D 1.74819
and the ſum will be 3.85912
the half of which is 1.92956
the logarithm of the hypothenuſe required. See LOGARITHM.

Or it may be done by adding the ſquare of the two ſides together, and taking the logarithm of that ſum, the half of which is the logarithm of the hypothenuſe required: thus, in the preſent caſe,
the ſquare of A B (64) is 4096
the ſquare of B D (56) is 3136
the ſum of theſe ſquares is 7232
the log. of which is 3.85926
the half of which is 1.92963 =
to the logarithm of 85.05, the length of the hypothenuſe required.

Caſe VII. The hypothenuſe and one of the legs being given, to find the other leg.

Example: in the triangle B G D, (*ibid.* n° 8.) ſuppoſe the leg B G = 87, and the hypothenuſe B D = 142; required the leg D G.

1. Geometrically: the conſtruction here is the ſame as in caſe V. the ſame things being given; and the leg D G is found by taking its length in your compaſſes, and applying that to the ſame line of equal parts, the others were taken from.

2. By calculation: the ſolution of this caſe depends upon the 1ſt and 5th, and firſt we muſt find the oblique angles by caſe 5th thus:

D B : B G :: R : S, D.

i. e. as the hypoth. D B	142	2.15229
is to the leg B G	87	1.93952
ſo is radius	90°,	10.00000
to the ſine of D	37°, 47′	9.78723

Then by caſe 1ſt, we find the leg D G required, thus:

R : S, B :: B D : D G,

i. e. as radius	90°	10.00000
is to the ſine of B	52°, 13′	9.89781
ſo is the hypoth. D B	142	2.15229
to the leg D G	112.2	2.05010

The leg D G may alſo be found in the following manner, *viz.*
To the log. of the ſum of the hypothenuſe and given leg, *viz.* 229 - } 2.35984
add the log. of their difference, *viz.* 55 1.74036
and their ſum is 4.10020
the half of that is 2.05010
the log. of 112.2 the leg required.

Or it may be done by taking the ſquare of the given leg from the ſquare of the hypothenuſe, and the ſquare root of the remainder is the leg required; thus, in the preſent caſe.
The ſquare of the hypothenuſe (142) is - 20164
The ſquare of the leg B G (87) is 7569
Their difference is 12595
Whoſe logarithim is 4.10020
The half of which is 2.05010
which anſwers to the natural number 112.2 the leg required.

Thus have we gone through the ſeven caſes of right-angled plane-trigometry; from which we may obſerve; 1. That to find a ſide, when the angles are given, any ſide may be made the radius. 2. To find an angle, one of the given ſides muſt of neceſſity be made the radius.

II. We now proceed to oblique-angled plane trigonometry, in which there are ſix caſes; but before we ſhew their ſolution, it will be proper to premiſe the following theorems.

Theorem 1. In any triangle ABC (plate CCLXXXIV. fig. 1. n° 1.) the ſides are proportional to the ſines of the oppoſite angles: thus, in the triangle A B C, A B : B C :: S, C : S, A, and A B : A C :: S, C : S, B: alſo A C : B C :: S, B : S, A.

Demonſtration: let the triangle A B C be inſcribed in a circle; then, it is plain (from the property of the circle) that the half of each ſide is the ſine of its oppoſite angle: but the ſines of theſe angles, in tabular parts, are proportional to the ſines of the ſame in any other meaſure; therefore, in the triangle A B C, the ſines of the angles will be as the halves of their oppoſite ſides; and ſince the halves are as the wholes, it follows, that the ſines of the angles are as their oppoſite ſides; *i. e.* S, C : S, A :: A B : B C, *&c.*

Theor. 2. In any plane triangle, as A B C (*ibid.* n° 2.) the ſum of the ſides, A B and B C, is to the difference of theſe ſides, as the tangent of half the ſum of the angles B A C, A B C, at the baſe, is to the tangent of half the difference of theſe angles.

Demon. Produce A B; and make B H equal to B C; join H C, and from B let fall the perpendicular B E; through B draw B D parallel to A C, and make H F equal to C D, and join B F; alſo take B I equal to B A, and draw I G parallel to B D or A C.

Then

Then it is plain that AH will be the ſum, and HI the difference of the ſides AB and BC; and ſince HB is equal to BC, and BE perpendicular to HC, therefore HE is equal to EC; and BD being parallel to AC and IG, and AB equal to BI, therefore CD or HF is equal to GD, and conſequently HG is equal to FD, and half HG is equal to half FD or ED. Again, ſince HB is equal to BC, and BE perpendicular to HC, therefore the angle EBC is half the angle HBC; but the angle HBC is equal to the ſum of the angles A and C, conſequently the angle EBC is equal to half the ſum of the angles A and C. Alſo ſince HB is equal BC, and HF equal to CD, and the included angles BHF, BCD equal, it follows that the angle HBF is equal to the angle DBC, which is equal to BCA; and ſince HBD is equal to the angle A, and HBF equal to BCA, therefore FBD is the difference, and EBD half the difference of the two angles A and BCA; ſo making EB the radius, it is plain EC is the tangent of half the ſum, and ED the tangent of half the difference of the two angles at the baſe. Now IG being parallel to AC, the triangles HIG and HAC will be equiangular; conſequently AH : IH :: CH : GH; but the wholes are as their halves, therefore AH : IH :: $\frac{1}{2}$CH : $\frac{1}{2}$GH; and ſince $\frac{1}{2}$CH is equal to EC, and $\frac{1}{2}$GH equal to $\frac{1}{2}$FD = ED, therefore AH : IH :: EC : ED. Now AH is the ſum, and IH the difference of the ſides; alſo EC is the tangent of half the ſum, and ED the tangent of half the difference of the two angles at the baſe; conſequently, in any triangle, as the ſum of the ſides is to their difference, ſo is the tangent of half the ſum of the angles at the baſe to the tangent of half their difference.

Theorem 3. If to half the ſum of two quantities be added half their difference, the ſum will be the greater of them; and if from half their ſum be ſubtracted half their difference, the remainder will be the leaſt of them. Suppoſe the greater quantity to be $x = 8$, and the leſſer $x = 6$; then is their ſum 14, and difference 2: wherefore, adding $\frac{14}{2} = 7$ to $\frac{2}{2} = 1$, we get 8 the greateſt of the two quantities; and, in the ſame manner, $\frac{14}{2} - \frac{2}{2} = 7 - 1 = 6$, the leaſt of the two quantities.

Theor. 4. In any right-lined triangle, ABD (*ibid.* n° 3.) the baſe AD is to the ſum of the ſides AB and BD, as the difference of the ſides is to the difference of the ſegments of the baſe made by the perpendicular BE, *viz.* the difference between AE and ED.

Demon. Produce DB till BG be equal to BA the leſſer leg; and on B as a center with the diſtance BA or BG, deſcribe the circle AGHF, which will cut BD and AD in the points H and F; then it is plain GD is the ſum, and HD the difference of the ſides; alſo ſince AE is equal to EF; therefore FD is the difference of the ſegments of the baſe; but AD : GD :: HD : FD; therefore the baſe is to the ſum of the ſides, *&c.* as was to be proved.

Having eſtabliſhed theſe preliminary theorems, we ſhall now proceed to the ſolution of the ſix caſes of oblique-angled plane trigonometry.

Caſe I. In any oblique-angled plane triangle, two ſides and an angle oppoſite to one of them being given, to find the angle oppoſite to the other.

Example: In the triangle ABC (*ibid.* n° 4.) ſuppoſe AB = 156, BC = 84, and the angle C (oppoſite to AB) = 56° 30′; required the angle A, oppoſite to BC.

1. Geometrically: Draw the line AC, and at any point of it, ſuppoſe C, make the angle C = 56° 30′; then take CB = 84, and with the length of 156 = AB taken in your compaſſes from the ſame ſcale of equal parts, fixing one point in B, with the other croſs AC in A. Laſtly, join A and B; ſo the triangle is conſtructed, and the required angle A may be meaſured by a line of chords.

2. By calculation: We have, by theor. 1. the following proportion for finding the angle A, *viz.*

AB : BC :: S, C : S, A.

i. e. as AB	156	2.19312
To BC	84	1.92428
So is S, C	56° 30′	9.92111
To S, A -	26° 41′ -	9.65227

Caſe II. The angles, and a ſide oppoſite to one of them, being given, to find a ſide oppoſite to another.

Example: In the triangle HBG (*ibid.* n° 5.) ſuppoſe the angle H 46° 15′, and the angle B 54° 22, conſequently the angle G 79° 23′, and the leg HB 125, required HG.

Geometrically: Draw HB 125, from any line of equal parts, and make the angle H 46° 15′, and B 54° 22′, then produce

produce the lines HG and BG till they meet one another in the point G; ſo the triangle is conſtructed, and HG is meaſured by taking its length in your compaſſes, and applying it to the ſame line of equal parts that HB was taken from.

2. By calculation: By the firſt of the preceding theorems, we have this analogy for finding HG, *viz.*

S, G : HB : : S, B : HG.

i. e. As the ſine of G	79° 23′	9.99250
is to the leg HB	125	2.09691
So is the ſine of B	54° 22′	9.90996
to the leg HG -	103.4	2.01437

Caſe III. Two ſides and an angle oppoſite to one of them given, to find the third ſide.

Example: In the triangle KLM (*ibid.* n° 6.) ſuppoſe the ſide KL 126 equal parts, and KM 130 of theſe parts, and the angle L (oppoſite to KM) 63° 20′, required the ſide ML.

1. Geometrically: The conſtruction of this caſe is the ſame with that in Caſe I. (there being the ſame things given in both) and the leg ML may be meaſured by applying it to the ſame line of equal parts that the other two were taken from.

2. By calculation: The ſolution of this caſe depends upon the two preceding ones; and, firſt, we muſt find the other two angles by Caſe I. thus:

MK : S, L : : KL : S, M.

i. e. As the ſide MK -	130	2.11394
To the ſine of L	63° 20′	9.95116
So is the ſide KL	126	2.10037
To the ſine of M	60° 1′	9.93759

Then by Caſe II. we have the required leg ML, thus:

S. L : S. K : : MK : ML.

i. e. As the ſine of L	63° 20′	9.95116
To the ſine of K	53° 39′	9.90602
So is MK	130	2.11394
To ML - -	117.2 -	2.06850

Caſe IV. Two ſides and the contained angle being given, to find the other two angles.

Example: In the triangle ACD (*ibid.* n° 7.) ſuppoſe AC = 103, AD = 126, and the angle A = 54° 30′; required the angles C and D.

1. Geometrically: Draw AD = 126, and make the angle A = 54° 30′; then ſet off 103 equal parts from A to C: laſtly, join C and D; and ſo the triangle is conſtructed, and the angles C and D may be meaſured by a line of chords.

2. By calculation: The ſolution of this caſe depends upon the ſecond and third of the preceding theorems; and firſt we muſt find the ſum and difference of the ſides, and half the ſum of the unknown angles, thus:

The leg AD is -	126
The leg AC is -	103
Their ſum is -	229
And their difference is - -	23
The ſum of the three angles A, D and C is	180°
The angle A is	54° 30′
So the ſum of the angles C and D will be -	125°, 30′
And half their ſum is - -	62° 45′

Then by theor. 2. we have the following proportion, *viz.*

As the ſum of the ſides AD and AC = 229 -		2.35984
To their difference -	23	1.36173
So is the tangent of half the ſum of the unknown angles C and D	62° 45′	10.28816
To tang. of half their difference -	11° 2′	9.29005

Now having half the ſum and half the difference of the two unknown angles C and D, we find the quantity of each of them by theorem 3. thus:

To half the ſum of the angles C and D, *viz.* -	62° 45′
Add half their difference, *viz.*	11° 02′
And the ſum is the greater ang. C	73° 47′
Again, from half their ſum, *viz.*	62° 45′
Take half their difference, *viz.*	11° 02′
And there will remain the leſſer angle D -	= 51° 43′

N. B. The greater angle is always that ſubtended by the greater ſide: thus, in the preſent caſe, the greater angle C, is ſubtended by the greater ſide AD; and the leſſer angle D, is ſubtended by the leſſer ſide AC.

Caſe V Two ſides and the contained angle being given, to find the third ſide.

Example: In the triangle BCD (*ibid.* n° 8.) ſuppoſe BC = 154, BD = 133, and the angle B = 56° 03′; required the ſide CD.

1. Geometrically: The conſtruction of this caſe is the ſame with that of the laſt, and the length of DC is found by taking its length in your compaſſes, and applying it to the ſame line of equal parts that the two legs were taken from.

2. By calculation: The ſolution of this caſe depends upon the ſecond and fourth; and firſt we muſt find the angles by the laſt caſe; thus:

As the ſum of the ſides BD and BC 287	-	2.45788
Is to their difference 21		1.32222
So is the tangent of half the ſum of the angles D and C	61° 58′	10.27372
To the tangent of half their difference 7, 50′	-	9.13806

So by theorem 3. we have the angles D and C thus:

To half the ſum of the angles D and C	-	61° 58′
Add half their difference		7° 50′
And the ſum is the greater angle D		69° 48′
Alſo, from half the ſum		61° 58′
Take half the difference		7° 50′
And there remains the leſſer angle C		54° 08′

Then by Caſe II. we have the following analogy for finding DC the leg required, *viz.*

S, C : BD : : S, B : DC.

i. e. As the ſine of C	54° 08′	9.90869
To BD -	133	2.12385
So is the ſine of B -	56° 03′	9.91883
To DC -	136.2	2.13399

Caſe VI. Three ſides being given, to find the angles.

Example: In the triangle ABC (*ibid.* n° 9.) ſuppoſe AB=156, AC=185.7, and BC=84; required the angles A, B, and C.

1. Geometrically Make AC=185.7 from any line of equal parts; and from the ſame line taking 156=AB in your compaſſes, fix one foot of them in A, and with another ſweep an arch; then take 84=BC in your compaſſes, and fixing one foot in C, with the other ſweep an arch, which will croſs the former in B: laſtly, join the points B and A, and B and C; ſo the triangle will be conſtructed, and the angles may be meaſured by a line of chords.

2. By calculation: Let fall the perpendicular, BD, from the vertex B, upon the baſe AC; which will divide the baſe into two ſegments AD and DC, the lengths whereof may be found by theor. 4. thus:

As the baſe AC	185.7 -	2.26893
To the ſum of the ſides AB and BC 240	-	2.38031
So is the diff. of the ſides	72 -	1.85733
To the difference of the ſegments of the baſe 93	-	1.96871

And having the ſum of the ſegments, *viz.* the whole baſe, and their difference, we find the ſegments themſelves, by theorem 3. thus:

To half the ſum of the ſegments	92.8
Add half their difference	46.5
And the ſum is the greater ſeg. AD	139.3
Alſo from half the ſum of the ſeg.	92.8
Take half their difference -	46.5
The remainder is the leſſer ſeg. DC	46.3

Now the triangle ABC is divided, by the perpendicular DB, into two right-angled triangles, ADB, and DBC; in the firſt of which are given the hypothenuſe AB=156, and the baſe AD=139.3, to find the oblique angles, for which we have (by Caſe V. of rectangular trigonometry) the following analogy, *viz.*

As AB -	156	2.19312
To AD	139.3	2.14395
So is the radius	90°	10.00000
To the co-ſine of the angle A -	26° 40′	9.95083

Alſo the angle C is found by the ſame caſe, thus:

As BC	84	1.92428
To CD -	46.3	1.66558
So is the radius -	90°	10.00000
To the co-ſine of C	56° 30′	9.74130

Having found the two angles A and C, we have the third, B, by taking the ſum of the other two from 180, thus:

The ſum of all the three angles is	180°
The ſum of A and C is	83° 10′
The angle B is	96° 50′

All the proportions uſed for the ſolutions of the ſeveral caſes in plain trigonometry, may be performed by the ſcale and compaſs. On the ſcale there are ſeveral logarithmic lines, *viz.* one of numbers, another of ſines, and one of tangents, *&c.* See the article SCALE.

And the way of working a proportion by theſe is this, *viz.* extend your compaſſes from the firſt term of your proportion, found on the ſcale, to the ſecond, and with that extent, fixing one foot in the third term, the other will reach the fourth term required.

Spherical TRIGONOMETRY, is the art whereby, from three given parts of a ſpherical triangle, we diſcover the reſt; and, like plane trigonometry, is either right-angled, or oblique-angled. But before we give the analogies for the ſolution of the ſeveral caſes in either, it will be proper to premiſe the following theorems.

Theorem 1. In all right-angled ſpherical triangles, the ſine of the hypothenuſe: radius: : ſine of a leg: ſine of its oppoſite angle. And the ſine of a leg: radius

radius : : tangent of the other leg : tangent of its oppoſite angle.

Demonſtration: Let EDAFG (plate CCLXXXIV. fig. 2. n° 1.) repreſent the eighth part of a ſphere, where the quadrantal planes EDFG, EDBC, are both perpendicular to the quadrantal plane ADFB; and the quadrantal plane ADGC is perpendicular to the plane EDFG; and the ſpherical triangle ABC is right-angled at B, where CA is the hypothenuſe, and BA, BC, are the legs.

To the arches GF, CB, draw the tangents HF, OB, and the ſines GM, CI, on the radii DF, DB; alſo draw BL the ſine of the arch AB, and CK the ſine of AC; and then join IK and OL. Now HF, OB, GM, CI, are all perpendicular to the plane ADFB. And HD, GK, OL, lie all in the ſame plane ADGC. Alſo FD, IK, BL, lie all in the ſame plane ADGC. Therefore, the right-angled triangles HFD, CIK, ODL, having the equal angles HDF, CKI, OLB, are ſimilar. And CK: DG : : CI : GM; that is, as the ſine of the hypothenuſe : rad. : : ſine of a leg : ſine of its oppoſite angle. For GM is the ſine of the arc GF, which meaſures the angle CAB. Alſo, LB : DF : : BO : FH; that is, as the ſine of a leg : rad. : : tang. of the other leg : tang. of its oppoſite angle. Q. E. D.

Hence it follows, that the ſines of the angles of any oblique ſpherical triangle ACD (*ibid.* n° 2.) are to one another, directly, as the ſines of the oppoſite ſides.

Hence it alſo follows, that, in right-angled ſpherical triangles, having the ſame perpendicular, the ſines of the baſes will be to each other, inverſely; as the tangents of the angles at the baſes.

Theorem 2. In any right-angled ſpherical triangle ABC (*ibid.* n° 3.) it will be, as radius is to the co-ſine of one leg, ſo is the co-ſine of the other leg to the co-ſine of the hypothenuſe.

Hence, if two right-angled ſpherical triangles ABC, CBD (*ibid.* n° 2.) have the ſame perpendicular BC, the co-ſines of their hypothenuſes will be to each other, directly, as the co-ſines of their baſes.

Theorem 3. In any ſpherical triangle it will be, as radius is to the ſine of either angle, ſo is the co-ſine of the adjacent leg to the co-ſine of the oppoſite angle.

Hence, in right-angled ſpherical triangles, having the ſame perpendicular, the co-ſines of the angles at the baſe will be to each other, directly, as the ſines of the vertical angles.

Theorem 4. In any right-angled ſpherical triangle it will be, as radius is to the co-ſine of the hypothenuſe, ſo is the tangent of either angle to the co-tangent of the other angle.

As the ſum of the ſines of two unequal arches is to their difference, ſo is the tangent of half the ſum of thoſe arches to the tangent of half their difference: and, as the ſum of the co-ſines is to their difference, ſo is the co-tangent of half the ſum of the arches to the tangent of half the difference of the ſame arches.

Theorem 5. In any ſpherical triangle ABC (*ibid.* n° 4. and 5.) it will be, as the co-tangent of half the ſum of the two ſides is to the tangent of half their difference, ſo is the co-tangent of half the baſe to the tangent of the diſtance (DE) of the perpendicular from the middle of the baſe.

Since the laſt proportion, by permutation, becomes co-tang. $\frac{AC+BC}{2}$: co-tang. AE : : tang. $\frac{AC-BC}{2}$: tang. DE, and as the tangents of any two arches are, inverſely, as their co-tangents; it follows, therefore, that tang. AE : tang. $\frac{AC+BC}{2}$: : tang. $\frac{AC-BC}{2}$: tang. DE; or, that the tangent of half the baſe is to the tangent of half the ſum of the ſides, as the tangent of half the difference of the ſides to the tangent of the diſtance of the perpendicular from the middle of the baſe.

Theorem 6. In any ſpherical triangle ABC (*ibid.* n° 4.) it will be, as the co-tangent of half the ſum of the angles at the baſe, is to the tangent of half their difference, ſo is the tangent of half the vertical angle to the tangent of the angle which the perpendicular CD makes with the line CF biſecting the vertical angle.

The Solution of the Cases of right-angled spherical Triangles, (*ibid.* n° 3.)

Case	Given	Sought	Solution
1	The hyp. A C and one angle A	The opposite leg B C	As radius : sine hyp. A C : : sine A : sine B C (by the former part of theor. 1.)
2	The hyp. A C and one angle A	The adjacent leg A B	As radius : co-sine of A : : tang. A C : tang. A B (by the latter part of theo. 1.)
3	The hyp. A C and one angle A	The other angle C	As radius : co-sine of A C : : tang. A : co-tang. C (by theorem 4.)
4	The hyp. A C and one leg A B	The other leg B C	As co-sine A B : radius : : co-sine A C : co-sine B C (by theorem 2.)
5	The hyp. A C and one leg A B	The opposite angle C	As sine A C : radius : : sine A B : sine C (by the former part of theor. 1.)
6	The hyp. A C and one leg A B	The adjacent angle A	As tang. A C : tang. A B : : radius : co-sine A (by theorem 1.)
7	One leg A B and the adjacent angle A	The other leg B C	As radius : sine A B : : tangent A : tangent B C (by theorem 4.)
8	One leg A B and the adjacent angle A	The opposite angle C	As radius : sine A : : co sine of A B : co-sine of C (by theorem 3.)
9	One leg A B and the adjacent angle A	The hyp. A C	As co-sine of A : radius : : tang. A B : tang. A C (by theorem 1.)
10	One leg B C and the opposite angle A	The other leg A B	As tang. A : tang. B C : : radius : sine A B (by theorem 4.)
11	One leg B C and the opposite angle A	The adjacent angle C	As co-sine B C : radius : : co-sine of A : sin. C (by theorem 3.)
12	One leg B C and the opposite angle A	The hyp. A C	As sin. A : sin. B C : : radius : sin. A C (by theorem 1.)
13	Both legs A B and B C	The hyp. A C	As radius : co-sine A B : : co-sine B C : co-sine A C (by theorem 2.)
14	Both legs A B and B C	An angle, suppose A	As sine A B : radius : : tang. B C : tang. A (by theorem 4.)
15	Both angles A and C	A leg, suppose A B	As sine A : co-sine C : : radius : co-sine A B (by theorem 3.)
16	Both angles A and C	The hyp. A C	As tang. A : co-tang. C : : radius : co-sine A C (by theorem 4.)

Note, The 10th, 11th, and 12th cases are ambiguous; since it cannot be determined by the data, whether A B, C, and A C, be greater or less than 90 degrees each.

The Solution of the Cases of oblique spherical Triangles, (*ibid* n° 4 and 5.)

Case	Given	Sought	Solution
1	Two sides A C, B C, and an angle A opposite to one of them.	The angle B opposite to the other	As sine B C : sine A : : sine A C : sine B (by theor. 1.) Note, this case is ambiguous when B C is less than A C; since it cannot be determined from the data whether B be acute or obtuse.
2	Two sides A C, B C, and an angle A opposite to one of them.	The included angle A C B	Upon A B produced (if need be) let fall the perpendicular C D: then (by theor. 4.) rad. : co-sine A C : : tang. A : co-tang. A C D; but (by theor. 1.) as tang. B C : tang. A C : : co sine A C D : co-sine B C D. Whence A C B = A C D ± B C D is known.

Case	Given	Sought	Solution
3	Two ſides A C, B C, and an angle oppoſite to one of them	The other ſide A B	As rad. : co-ſine A : : tang. A C : tang. A D (by theor. 1.) and (by theor. 2.) as co-ſin. A C : co-ſin. B C : : co-ſin. A D : co-ſin. B D. Note, this and the laſt caſe are both ambiguous when the firſt is ſo.
4	Two ſides A C, A B, and the included angle A	The other ſide B C	As rad. : co-ſin. A : : tang. A C : tan. A D (by theor. 1.) whence B D is alſo known : then (by theor. 2.) as co-ſine A D : co-ſine B D : : co-ſine A C : co-ſine B C.
5	Two ſides A C, A B, and the included angle A	Either of the other angles, ſuppoſe B	As rad. : co-ſine A : : tang. A C : tan. A D (by theorem 1.) whence B D is known : then (by theor. 4.) is ſine B D : ſine A D : : tan. A : tan. B.
6	Two angles A, A C B, and the ſide A C betwixt them	The other angle B	As rad. : co-ſine A C : : tang. A : co-tang. A C D (by theor. 4.) whence B C D is alſo known : then (by theor. 3.) as ſine A C D : ſine B C D : : co-ſine A : co-ſine B.
7	Two angles A, A C B, and the ſide A C betwixt them	Either of the other ſides, ſuppoſe B C	As rad. : co-ſine A C : : tang. A : co-tang. A C D (by theo. 4.) whence B C D is alſo known : then, as co-ſine B C D : co ſine A C D : : tang. A C : tang. B C (by theor. 1.)
8	Two angles A, B, and a ſide A C oppoſite to one of them	The ſide B C oppoſite the other	As ſine B : ſine A C : : ſine A . ſine B C (by theorem 1.)
9	Two angles A, B, and a ſide A C oppoſite to one of them	The ſide A B betwixt them	As rad. : co-ſine A : : tang. A C : tan. A D (by theor. 1.) and as : tang. B : tang. A : : ſine A D : ſine B D (by theor. 4.) whence A B is alſo known.
10	Two angles A, B, and a ſide A C oppoſite to one of them	The other angle A C B	As rad. : co-ſine A C : : tang. A : co-tang. A C D (by theor. 4.) and as co-ſine A : co-ſine B : : ſine A C D : ſine B C D (by theor. 3.) whence A C B is alſo known.
11	All the three ſides A B, A C, and B C	An angle, ſuppoſe A	As tang. $\frac{1}{2}$ A B : tang. $\frac{AC+BC}{2}$: tang. $\frac{AC-BC}{2}$: tang. D E, the diſtance of the perpendicular from the middle of the baſe (by theor. 6.) whence A D is known : then, as tang. A C : tang. A D : : rad. : co-ſine A (by theorem 1.)
12	All the three angles A, B, and A C B	A ſide, ſuppoſe A C	As co-tan. $\frac{ABC+A}{2}$: tang. $\frac{ABC-A}{2}$: : tang. $\frac{ACB}{2}$: tang. of the angle included by the perpendicular and a line biſecting the vertical angles ; whence A C D is alſo known : then (by theor. 5.) tang. A : co-tang. A C D : : rad. co-ſine A C.

Note, in letting fall your perpendicular, let it always be from the end of a given ſide, and oppoſite to a given angle.

TRILLION, in arithmetic, a billion of billions. See NUMERATION.

TRILLO, in muſic, the ſame with cadence. See the article CADENCE.

TRIM *of a ſhip*, her beſt poſture, proportion of ballaſt, and hanging of her maſts, *&c.* for ſailing. To find the trim of a ſhip, is to find the beſt way of making her ſail ſwiftly, or how ſhe will ſail beſt. This is done by eaſing of her maſts and ſhrouds; ſome ſhips ſailing much better when they are ſlack, than when they are tautor faſt: but this depends much upon experience and judgment, and the ſeveral trials and obſervations which the commander and other officers may make aboard.

TRIMACRUS, or TRIMACER, a foot, in antient poetry, the ſame with the moloſſus. See MOLOSSUS and FOOT.

TRIMMERS, in architecture, pieces of timber framed at right-angles to the joints, againſt the ways for chimneys, and well-holes for ſtairs.

TRINE, in aſtrology, the aſpect or ſituation of one ſtar with regard to another, when they are diſtant 120 degrees: it is noted with this character △.

TRING, a market-town of Hertfordſhire, twenty-four miles weſt of Hertford.

TRINGA, in ornithology, a genus of birds belonging to the order of the ſcolopaces, the characters of which are theſe: the beak is of a cylindric figure, obtuſe at the extremity, and in length about equal to the toes: the feet have each four toes, and they are connected.

To this genus belongs the ruff, the cinclus, the lapwing, the godwit, the tolk, grey plover, *&c.* See RUFF, CINCLUS, *&c.*

TRINGLE, in architecture, a name common to ſeveral little ſquare members or ornaments, as reglets, liſtels, and plat-bands.

TRINGLE is more particularly uſed for a little member fixed exactly over every triglyph, under the plat-band of the architrave, from whence the guttæ or pendant-drops hang down.

TRINIDAD, or TRINITY-ISLAND, is ſituated in the Atlantic or American ocean, between 60° and 62° of weſt longitude, and between 9° and 11° of north latitude; it is about ninety miles long, and ſixty broad.

TRINADAD, a port-town of Mexico, in America, ſituated in the province of Guatimala, an hundred and twenty miles ſouth-eaſt of the city of Guatimala: weſt long. 94°, north lat. 13°.

TRINITARIANS, thoſe who are orthodox and believe in the trinity: thoſe who do not believe therein, being called anti-trinitarians.

Trinitarians alſo denote an order of religious inſtituted at Rome in the year 1198, under the pontificate of Innocent III. the founders whereof were John de Matha, and Felix de Valois. His holineſs gave them permiſſion to eſtabliſh this order for the deliverance of captives, who groaned under the tyranny of the infidels: he gave them, as a habit, a white gown ornamented with a red and blue croſs. After the death of the two founders, pope Honorius III. continued the order, and their rule was approved by his ſucceſſor Clement IV. in 1267. At firſt they were not permitted to eat fleſh, and, when they travelled, were to ride only upon aſſes. But their rule was corrected and mitigated by the biſhop of Paris, and the abbots of St. Victor and St. Genevieve, who allowed them to eat any kind of food, and to uſe horſes. This order poſſeſſes about two hundred and fifty convents in thirteen different provinces: ſix of which are in France; namely, France, Normandy, Picardy, Champaine, Languedoc, and Provence; three in Spain, *viz.* New Caſtile, Old Caſtile, and Arragon; one is in Italy, and one in Portugal. There was formerly the province of England, where this order had forty-three houſes; that of Scotland, where it had nine; and that of Ireland, where it had fifty-two; beſides a great number of monaſteries in Saxony, Hungary, Bohemia, and other countries. The convent of Cerfroy in France is head of the order.

There are alſo nuns of the trinitarian order eſtabliſhed in Spain, by John de Matha himſelf, who built them a convent in 1201, under the direction of the infanta Conſtantia, daughter of Peter II. king of Arragon, who was the firſt religious, and the firſt ſuperior of that order. And, in 1612, Frances de Romero, daughter of Julian de Romero, lieutenant-general of the ſpaniſh army, founded a convent of barefooted trinitarian-nuns at Madrid.

TRINITY, *trinitas*, in theology, the ineffable myſtery of three perſons in one God; Father, Son, and Holy Spirit. See the article GOD, *&c.*

The doctrine of the trinity, as profeſſed

feſſed in the chriſtian church, is as follows: that there is but one God in three diſtinct perſons, Father, Son, and Holy Ghoſt; *perſon* ſignifying the ſame as *eſſence*, with a particular manner of ſubſiſtence, which the greek fathers call hypoſtaſis, taking it for the incommunicable property that makes a perſon. The Father, Son, and Holy Ghoſt are believed to be three diſtinct perſons in the divine nature, becauſe the ſcriptures, in ſpeaking of theſe three, diſtinguiſh them from one another, as we uſe in common ſpeech to diſtinguiſh three ſeveral perſons. There are many inſtances to this purpoſe; particularly the form of adminiſtring the ſacrament of baptiſm, which runs in the name of the Father, the Son, and the Holy Ghoſt: and that ſolemn benediction, with which St. Paul concludes his ſecond epiſtle to the Corinthians: "The grace of our Lord Jeſus "Chriſt, *&c.*" and the three witneſſes in heaven, mentioned by St. John. Each of theſe three perſons are affirmed to be God, becauſe the names, properties, and operations of God are, in the holy ſcripture, attributed to each of them.

The divinity of the Father is undiſputed. That of the Son is proved from the following texts, among many others. St. John ſays, "The Word was God;" St. Paul, "That God was manifeſted in the fleſh; that Chriſt is over all, God bleſſed for ever." Eternity is attributed to the Son: "the Son hath life in himſelf:" perfection of knowledge: "as the Father knoweth me, ſo know I the Father." And we are commanded, "To honour the Son, as we honour the Father." The divinity of the Holy Ghoſt reſts upon the following proofs, among others: Lying to the Holy Ghoſt, is called "lying to God:" becauſe Chriſtians are the temples of the Holy Ghoſt, they are ſaid to be the "temples of God." "His teaching all things; his guiding into all truth; his telling things to come; his ſearching all things, even the deep things of God, *&c.*" are adduced as plain characters of his divinity. Beſides, he is joined with God the Father, as an object of faith and worſhip, in baptiſm, and the apoſtolical benediction. Many of the heathens ſeem to have had a notion of a trinity in the Godhead; Plato and his followers ſpeak of it in ſuch terms, that the primitive fathers have been accuſed of borrowing the doctrine itſelf from the platonic ſchool. This point is treated at large in Cudworth's Intellectual Syſtem.

The ſeveral anti-trinitarian hereſies may be ſeen under their reſpective articles. See ARIANS, SABELLIANS, SOCINIANS, *&c.*

TRINITY-SUNDAY, a feſtival of the chriſtian church, obſerved on the Sunday next after Whitſunday, in honour of the holy and undivided trinity. The obſervation of this feſtival was firſt enjoined in the council of Arles, *anno* 1260.

TRINITY-HOUSE, a kind of college at Deptford, belonging to a company or corporation of ſeamen, who, by the king's charter, have power to take cognizance of thoſe perſons who deſtroy ſea-marks, and to get reparation of ſuch damages; and to take care of other things belonging to navigation. At preſent, many gentry and ſome nobility are members of that community.

The maſter, wardens, and aſſiſtants of the trinity-houſe, may ſet up beacons, and marks for the ſea, in ſuch places, near the coaſts or forelands, as to them ſhall ſeem meet. By a ſtatute of queen Elizabeth, no ſteeple, trees, or other things ſtanding as ſea marks, ſhall be taken away or cut down, upon pain that every perſon guilty of ſuch offence, ſhall forfeit 100l. and if the perſon offending be not poſſeſſed of the value, he ſhall be deemed convict of outlawry.

Fraternity of the TRINITY, a religious ſociety inſtituted at Rome by St. Philip Neri, in 1548. Theſe religious were appointed to take care of the pilgrims who came to viſit the tombs of St. Peter and St. Paul. The ſociety originally conſiſted of only fifteen religious, who aſſembled on the firſt Sunday of every month, in the church of St. Saviour del Campo, to hear the exhortations of the founder; after whoſe death pope Paul IV. gave the fraternity the church of St. Benedict, near which they have ſince built a large hoſpital, for the reception of pilgrims. The fraternity is one of the moſt conſiderable in Rome, and moſt of the nobility of both ſexes have been members thereof.

TRINOMIAL, or TRINOMIAL ROOT, in mathematics, is a root conſiſting of three parts connected together by the ſigns + or −, as $x+y+z$, or $a+b-c$. See the articles BINOMIAL and ROOT.

TRINQUIMALE, a port town of the iſland of Ceylon, ſituated on the north-eaſt part of the iſland: eaſt long. 80°, north lat. 9°.

TRIO,

TRIO, in muſic, a part of a concert wherein three perſons ſing; or more properly a muſical compoſition conſiſting of three parts. Trios are the fineſt kinds of compoſition, and theſe are what pleaſe moſt in concerts.

TRIOCLITE, in aſtrology, an aſpect or ſituation of two planets with regard to the earth, when they are three octants or eight parts of a circle; *i. e.* 135° diſtant from each other. This aſpect, which ſome call the ſeſquiquadrans, is one of the new aſpects ſuperadded to the old ones by Kepler.

TRIONES, in aſtronomy, a ſort of conſtellation or aſſemblage of ſeveral ſtars in in the urſa minor, commonly called Charles's wain. See the article URSA.

TRIONUM, in botany, a genus of the *monadelphia-polyandria* claſs of plants, the corolla whereof conſiſts of five patent petals, vertically cordated, and united together at the baſe: the fruit is an ovated quinquangular capſule, conſiſting of five cells, and containing five valves the ſeeds are numerous, and kidney ſhaped.

TRIOPTERIS, in botany, a genus of the *decandria-trigynia* claſs of plants, the corolla whereof conſiſts of ſix oval, erecto-patulous, equal and permanent petals, ſurrounded by three others ſmaller than themſelves, but equal to one another: there is no pericarpium: the ſeeds are three, erect and carinulated at the back; each of them has externally at its baſe an ala, and at its apex two; theſe ala are what in the flowering ſtate of the plant appear to be petals, but they are not truly ſuch.

TRIOSTEOSPERMUM, in botany, the ſame with the lanicera. See the article LANICERA.

TRIOURS, in law, are ſuch perſons as are choſen by the court to examine whether a challenge made to the whole panel of jurors, or any part of them, be juſt or not.

TRIP, a ſea term. A ſhip is ſaid to bear her top-ſails at trip, when ſhe carries them hoiſted up to the higheſt.

TRIPARTITE, *tripartitus*, ſomething divided into three parts, or made by three parties, as indenture tripartite, *&c.*

TRIPARTITION, a diviſion by three, or the taking the third part of any number or quantity.

TRIPELAS, in natural hiſtory, earths compoſed of apparently ſimilar particles, naturally dry, and of rough duſty ſurfaces, but ſomewhat more firmly coherent than the ochres, compoſed of fine but hard particles, and not readily diffuſible in water. Of this genus of earths authors make five ſpecies, which may be reduced to the yelloviſh and the reddiſh; for an account of which, ſee the article TRIPOLI.

TRIPHTHONGUE, in grammar, an aſſemblage or concourſe of three vowels in the ſame ſyllable, as *quae*.

TRIPLE, threefold. See RATIO and *Sub-*TRIPLE.

TRIPLE, in muſic, is one of the ſpecies of meaſure or time. See the articles TIME and MEASURE.

Triple-time conſiſts of many different ſpecies, whereof there are in general four, each of which has its varieties. The common name triple is taken hence, that the whole half of the bar is diviſible into three parts, and is beaten accordingly. The firſt ſpecies is called the ſimple triple, wherein the meaſure is equal to three ſemibreves, three minims, three crotchets, three quavers, or three ſemiquavers, which are marked thus, $\frac{3}{1}$ $\frac{3}{2}$ $\frac{3}{4}$ $\frac{3}{8}$ $\frac{3}{16}$, but the laſt is not much uſed, except in church muſic. In all theſe the meaſure is divided into three equal parts or times, called thence triple-time, or the meaſure of three times; whereof two are beat down, and the third up. The ſecond ſpecies is the mixed triple; its meaſure is equal to ſix crotchets, or ſix quavers, or ſix ſemiquavers, and accordingly is marked $\frac{6}{4}$ or $\frac{6}{8}$ or $\frac{6}{16}$; but the laſt is ſeldom uſed. The meaſure here is uſually divided into equal parts or times, whereof one is beat down and one up; but it may alſo be divided into ſix times, whereof the firſt two are beat down and the third up, then the next two down and the laſt up; *i. e.* each half of the meaſure is beat like the ſimple triple (on which account it may be called the compound triple) and becauſe it may be thus divided either into two or ſix times (*i. e.* two triples) it is called mixed, and by ſome the meaſure of ſix times. The third ſpecies is the compound triple, conſiſting of nine crotchets or quavers, or ſemiquavers, marked $\frac{9}{4}$ $\frac{9}{8}$ $\frac{9}{16}$, the firſt and laſt are little uſed; ſome alſo add $\frac{9}{1}$ $\frac{9}{2}$, which are never uſed; ſome add alſo other two, *viz.* ſix ſemibreves and ſix minims, marked $\frac{6}{1}$ or $\frac{6}{2}$, but theſe are not in uſe. This meaſure is divided into three equal parts or times, whereof two are beat down and one up; or each third part may be divided into three

three times, and beat like the ſimple triple, on which account it is called the meaſure of the nine times. The fourth ſpecies is a compound meaſure of the ſecond ſpecies, containing twelve crotchets or quavers, or ſemiquavers, marked $\frac{12}{4}$ $\frac{12}{8}$ $\frac{12}{16}$, to which ſome add $\frac{12}{1}$ and $\frac{12}{2}$, which are never uſed; nor are the firſt and third much uſed, eſpecially the latter. The meaſure here may be divided into two times, and beat one down and one up; or each half may be divided and beat as the ſecond ſpecies, either by two or three, in which caſe it will make in all twelve times; and hence it is called the meaſure of twelve times. The french and italian authors make a great many more ſpecies and diviſions of triple-time, unknown, or at leaſt unregarded, by our engliſh muſicians, and therefore not neceſſary to be dwelt on here.

TRIPLICATE RATIO, the ratio which cubes bear to one another. See CUBE.

This ratio is to be diſtinguiſhed from triple ratio, and may be thus conceived. In the geometrical proportions 2, 4, 8, 16, 32, as the ratio of the firſt term (2) is to the third (8) duplicate of that of the firſt to the ſecond, or of the ſecond to the third, ſo the ratio of the firſt to the fourth is ſaid to be triplicate of the ratio of the firſt to the ſecond, or of that of the ſecond to the third, or of that of the third to the fourth, as being compounded of three equal ratios. See the article RATIO.

TRIPLICATION, *triplicatio*, in the civil law, the ſame with ſur-rejoinder. See the article SUR-REJOINDER.

TRIPLICITY, or TRIGON, among aſtrologers, is a diviſion of the ſigns according to the number of the elements, each diviſion conſiſting of three ſigns. Triplicity is frequently confounded with trine aſpect, though ſtrictly ſpeaking the two are very different things; as triplicity is only uſed with regard to the ſigns, and trine, on the contrary, with regard to the planets. The ſigns of triplicity are thoſe which are of the ſame nature, and not thoſe which are in trine aſpect. Thus leo, ſagittarius, and aries, are ſigns of triplicity, becauſe thoſe ſigns are by theſe writers all ſuppoſed fiery.

TRIPOD, *tripos*, in antiquity, a famed ſacred ſeat or ſtool, ſupported by three feet, whereon the prieſts and ſibyls were placed to render oracles. It was on the tripod that the gods were ſaid to inſpire the Pythians with that divine fury and enthuſiaſm wherewith they were ſeized at the delivery of their predictions.

TRIPOLI, a ſtate of Africa, which including Barca, is bounded by the Mediterranean-ſea on the north, by Egypt on the eaſt, by Nubia and Bildulgerid on the ſouth, and by Tunis on the weſt; extending along the ſhore of the Mediterranean from the north-weſt to the ſouth-eaſt about a thouſand miles, but ſcarce two hundred miles broad in any place. The city of Tripoli, being the capital of this ſtate, is ſurrounded with a wall and other fortifications: eaſt long. 14° 30′, north lat. 33° 30′.

TRIPOLI is alſo a port-town of Syria, ſituated on the Levant, being the chief town of that part of Syria antiently called Phœnicia, ſituated at the foot of mount Libanus: eaſt long. 36° 15′, north lat. 34° 40′.

TRIPOLI, in natural hiſtory, the name of an earthy ſubſtance which is a ſpecies of the tripelas. See TRIPELAS.

This earth is much uſed by the lapidaries to poliſh ſtones, and by the braſiers, and other the like artiſts, to clean metalline veſſels. It is of two kinds, the yellowiſh, and reddiſh-white; the yellowiſh-white kind is called by authors alana gleba, tripolis and terra tripolitana; this is the produce of Germany, Saxony, and France; there is alſo of it in the neighbourhood of Venice, but it is found in greateſt plenty in many parts of Africa. It is found a dry hard earth, of a very pale yellowiſh-white, of a firm texture, and moderately heavy; it is ſometimes found of itſelf, conſtituting a ſtratum; but it is more frequently met with in detached pieces among ſtrata of other matter. It is of a rough, irregular, duſty ſurface; it adheres ſlightly to the tongue, is dry, hard, and harſh to the touch, is not to be broken between the fingers, and ſlightly ſtains the hands: it makes no effervescence with aqua fortis, and makes a ſlight hiſſing noiſe on being thrown into water. The reddiſh tripoli is of our own production, though not peculiar to our country; it is found in great abundance on Mendip-hills in Somerſetſhire, and not leſs plentifully in many parts of Germany. This is well known in the ſhops as a ſubſtance of great uſe in poliſhing braſs, but is not applied to any of the other uſes of the yellowiſh kind: this, like the former, is moſt fre-

quently found in detached maſſes, and while in the earth is tolerably ſoft, and eaſily falls into flakes. When dry it becomes of a conſiderable hardneſs, and is of a fine pale reddiſh-white, of a looſe open texture, compoſed of a multitude of extremely thin plates or flakes laid evenly on one another, and conſiderably heavy; it is of a ſmooth and ſomewhat gloſſy ſurface; it adheres very firmly to the tongue, is dry and harſh to the touch, too hard to be broken between the fingers, and does not ſtain the hands: it makes no efferveſcence with acids, and burns to a paler colour, with ſome additional hardneſs.

TRIPPING, in heraldry, denotes the quick motion of all ſorts of deer, and of ſome other creatures, repreſented with one foot as it were on a trot.

TRIPTOTES, *triptota*, in grammar, defective nouns which have only three caſes; ſuch is *mele*, *tempe*, *grates*, *prece*, &c.

TRIQUIER, a port-town of France, in the province of Britanny, ſituated on the engliſh channel, fifty miles weſt of St. Malo.

TRIQUETROUS, among botaniſts, expreſſes a fruit or leaf that has three ſides or faces all flat. This leaf is uſually ſubulated, or grows gradually ſmaller from the baſe to the point.

TRIREME, or TRIREMIS, in antiquity, a gally with three ranks of oars on a ſide.

TRISECTION, or TRISSECTION, the dividing a thing into three. The term is chiefly uſed in geometry, for the diviſion of an angle into three equal parts. The triſection of an angle geometrically, is one of thoſe great problems whoſe ſolution has been ſo much ſought by mathematicians for theſe two thouſand years, being in this reſpect on a footing with the quadrature of the circle, and the duplicature of the cube angle.

TRISMEGISTUS, an epithet or ſurname given to one of the two Hermeſes, or Mercuries, kings of Thebes in Egypt, who is ſaid to be contemporary with Moſes.

TRISOLYMPIONICA, among the antients, a perſon who had thrice borne away the prize at the olympic games; theſe had great privileges and honours paid them. See OLYMPIC-GAMES.

TRISPAST, *triſpaſton*, in mechanics, a machine with three pullies, or an aſſemblage of three pullies for raiſing of great weights. See the article PULLY.

TRISYLLABLE, or TRISSYLLABLE, in grammar, a word conſiſting of three ſyllables.

TRITE, in muſic, the third muſical chord in the ſyſtem of the antients. See the article CHORD.

TRITICEA, the name whereby ſome authors call the triticum. See the next article.

TRITICUM, in botany, a genus of the *triandria-digynia* claſs of plants, the corolla whereof conſiſts of two valves, nearly equal in ſize, and of the bigneſs of thoſe of the cup. The exterior valve is bellied with an obtuſe end, terminated by a point; the interior valve is plane. The corolla ſerves inſtead of a pericarpium, incloſing the ſeed, which is ſingle, obtuſe, and furrowed on one ſide.

This genus comprehends the common wheat, the ſpelt-corn, and couch-graſs. See the article WHEAT, &c.

TRITON, in ichthyology, a genus of fiſh, the body of which is oblong, the roſtrum at the mouth of a ſpiral form, the tentacula fourteen in number, and twelve of them cheliferous.

TRITON, in poetry, a ſea demi-god, held by the antients to be an officer or trumpeter of Neptune, attending on him, and carrying his orders and commands from ſea to ſea.

The poets repreſent him as a half man, half fiſh, terminating in a dolphin's tail, and bearing in one hand a ſea-ſhell, which ſerves as a trumpet. Some of the antients make him the ſon of Neptune and the nymph Salacia; Heſiod, of Neptune and Amphitrite; Neumenius, in his book de Piſcationibus, makes him the ſon of Oceanus and Tethys; and Lycophron, the ſon of Nereus. But, though Heſiod and the mythologiſts only ſpeak of one Triton, the poets have imagined ſeveral, giving ſome of them for trumpeters to all the ſea-gods, particularly to Neptune and Venus; accordingly they were frequently introduced on the antient theatres, in the Naumachia.

TRITONE, *tritono*, in muſic, a falſe concord conſiſting of three tones, or a greater third and a greater tone.

Its ratio or proportion in numbers is of 45 to 32. In dividing the octave we find on one ſide the falſe fifth, and the tritone on the other.

The tritone is a kind of redundant fourth, conſiſting of three tones, whence its name; or more properly of two tones, with a greater

greater ſemi-tone and a leſſer, as of *ut* to *fa*, ſharp; of *fa* to *ſi*, flat, *&c.* But it is not, as many imagine, a greater fourth, for the fourth is a perfect interval, which does not admit of any majority or minority; nor muſt the tritone be confounded with the falſe fifth, for the tritone only comprehends four degrees, *viz. ut, re, mi, fa*, ſharp; whereas the falſe fifth comprehends five, *viz. fa* ſharp, *ſol, la, ſi, ut*: beſides, that among the ſix ſemi-tones which compoſe the tritone chromatically, there are three greater and three leſſer; whereas, among the ſix ſemi-tones which compoſe the falſe fifth, there are only two leſſer and four greater.

TRITURATION, *tritura*, in pharmacy, the act of reducing a ſolid body into a ſubtile powder; called alſo levigation and pulverization. See LEVIGATION and PULVERIZATION.

This is principally employed to reduce hard ſubſtances to fine powders, either by the mortar, or by way of levigation on a marble: there is little difficulty in this, beſides the labour. Trituration has a great ſhare in ſome inſtances, in raiſing or depreſſing the efficacy of what comes under its management; for in grinding all thoſe bodies, whoſe efficacy conſiſts in the peculiar ſhape and points of their component parts, the more and finer they are broke, the leſs they will operate: thus may calomel be rendered much gentler, and made capable of being given in much larger quantities, only by long rubbing in a glaſs mortar; for the continual triture has the ſame effect upon it, as repeated ſublimation, which is only breaking of the ſaline ſpicula more and more, until it becomes almoſt plain mercury. But in reſinous ſubſtances, particularly thoſe which are purgative, as jalap, ſcammony, *&c.* the finer the powder they are reduced into, the greater their efficacy is likely to be. As the ſenſe which the ſtomach and bowels have of them, is in proportion to their contacts, therefore the more the ſame quantity is divided, the farther will it diffuſe itſelf, and vellicate the fibres; that is, in other words, it will work the more.

TRITURATION is alſo uſed in medicine for the action of the ſtomach on the food, whereby it is fitted for nouriſhment. See the article DIGESTION.

TRIVENTO, a town of Italy, in the kingdom of Naples, and principality of Moliſe, ſituated fifty five miles north eaſt of Naples.

TRIUMFETTA, in botany, a genus of the *polyandria-digynia* claſs of plants, the corolla of which conſiſts of five linear, erect, obtuſe petals, hollowed, deciduous, and bent backwards; the point is prominent below the apex; the fruit is a globoſe capſule, every where ſurrounded with hooked prickles, and contains four cells; the ſeeds are two, convex on one ſide and angular on the other: but only one of the two ſeeds of each cell uſually ripens.

TRIUMPH, in roman antiquity, a public and ſolemn honour conferred by the Romans on a victorious general, by allowing him a magnificent entry into the city. The triumph was of two kinds, the leſſer, and greater, the firſt of which is the ſame with the ovation. See OVATION.

The greater triumph, called alſo curulis, or ſimply the triumph, was decreed by the ſenate to a general, upon the conquering of a province, or gaining a ſignal victory. The day appointed for the ceremony being arrived, ſcaffolds were erected in the forum and circus, and all the other parts of the city, where they could beſt behold the pomp: the ſenate went to meet the conqueror without the gate called capena or triumphalis, and marched back in order to the capitol; the ways being cleared and cleanſed by a number of officers and tipſtaffs, who drove away ſuch as thronged the paſſage, or ſtraggled up and down. The general was clad in a rich purple robe, interwoven with figures of gold, ſetting forth his great exploits; his buſkins were beſet with pearl, and he wore a crown, which at firſt was only laurel, but afterwards gold; in one hand he bore a branch of laurel, and in the other a truncheon. He was drawn in a magnificent chariot, adorned with ivory and plates of gold, drawn uſually by two white horſes; though ſometimes by other animals, as that of Pompey, when he triumphed over Africa, by elephants: that of Marc Antony, by lions; that of Heliogabulus, by tygers; that of Aurelian, by deer, *&c.* His children were at his feet, and ſometimes on the chariot-horſes. The proceſſion was led up by the muſicians, who played triumphal pieces, in praiſe of the general: theſe were followed by young men, who led the victims to the ſacrifice, with their horns gilded, and their heads adorned with ribbands and garlands; next came the cars and waggons, loaded with all the ſpoils taken from the enemy, with their

horſes, chariots, &c. theſe were followed by the kings, princes, and generals, who had been taken captives, loaden with chains: after theſe appeared the triumphal chariot, before which, as it paſſed, they all along ſtrewed flowers, and the people, with loud acclamations, called out *Io triumphe!* The chariot was followed by the ſenate, clad in white robes; and the ſenate by ſuch citizens as had been ſet at liberty or ranſomed: and the proceſſion was cloſed by the prieſts and their officers and utenſils, with a white ox led along, for the chief victim. In this order they proceeded through the triumphal gate, along the via ſacra, to the capitol, where the victims were ſlain. In the mean time all the temples were open, and all the altars loaded with offerings and incenſe; games and combats were celebrated in the public places, and rejoicings appeared every where.

TRIUMVIR, one of three perſons who govern abſolutely, and with equal authority, in a ſtate. It is chiefly applied to the roman government: Cæſar, Pompey, and Craſſus were the firſt triumvirs, who divided the government amongſt them. There were alſo other officers, called triumvirs; as the triumviri or treſviri capitales, who were the keepers of the public goal; they had the office of puniſhing malefactors; for which purpoſe they kept eight lictors under them. There were alſo triumviri monetales, the maſters of the mint; whence the following mark is ſtill extant on many antient coins, III VIRI. Sometimes they were ſtyled triumviri A. A. Æ. F. F. theſe letters ſtanding for auro, argento, ære, flando, feriendo. There were likewiſe nocturnal triumviri, inſtituted to prevent or extinguiſh fires in the night.

TRIUMVIRATE, an abſolute government adminiſtred by three perſons, with equal authority. See the preceding article.

There were two famous triumvirates at Rome; Pompey, Cæſar, and Craſſus, as mentioned in the preceding article, eſtabliſhed the firſt; and Auguſtus, Marc Antony, and Lepidus, the ſecond; which gave the laſt blow to the roman republic, for Auguſtus having vanquiſhed Lepidus and Antony, the triumvirate ſunk into a monarchy.

TROCHAIC VERSE, in the latin poetry, a kind of verſe, ſo called becauſe the trochees chiefly prevail, as the iambus does in the iambic. It generally conſiſts of ſeven feet and a ſyllable; the odd feet, for the moſt part, conſiſt of trochees, though a tribrachys is ſometimes admitted, except in the ſeventh foot: theſe two feet are likewiſe uſed in the other places, as is alſo the ſpondæus, dactylus, and anapæſtus. The following is an example.

1 2 3 4 5 6
Solus | aut rex | aut po|eta | non quot|annis |
7 ½
naſci|tur.

TROCHANTER, in anatomy, a name given to two apophyſes, ſituated in the upper part of the thigh bone: they receive the tendons of moſt of the muſcles of the thigh. See FEMUR.

TROCHE, *trochiſcus*, in pharmacy, a ſort of medicine, made of glutinous ſubſtances, into little cakes, and afterwards exſiccated. The four following rules are to be obſerved in making of them: 1. The ingredients are to be reduced to a powder. 2. If the maſs proves ſo glutinous as to ſtick to the fingers in making up, the hands may be anointed with any convenient ſweet or aromatic oil; or elſe ſprinkled with powder of ſtarch, or with that of liquorice. 3. In order to dry thoroughly the troches, put them on an inverted ſieve, in a ſhady airy place, and frequently turn them. 4. The troches are to be kept in glaſs veſſels, or in earthen ones well glazed. There are troches of various kinds, and for various intentions, as purgative, alterative, aperitive, corroborative, &c. The chief troches now in uſe are thoſe of myrrh and liquorice, and thoſe of the teſtaceous powders for the heart-burn.

TROCHEE, *trochæus*, in the greek and latin poetry, a foot conſiſting of two ſyllables, the firſt long, and the ſecond ſhort, as in the words mūsă and sērvăt.

TROCHILUS, in architecture, a name uſed by the antients for what the moderns call ſcotia. See the article SCOTIA.

TROCHILUS, in ornithology, the purple humming-bird. See HUMMING BIRD.

TROCHITÆ, in natural hiſtory, a name given to the ſeparate joints of the entrochus. See the article ENTROCHUS.

TROCHLEA, one of the mechanical powers, uſually called a pulley. See the article PULLEY.

TROCHLEARES, in anatomy, a name given to the oblique muſcles of the eye. See the article OBLIQUUS.

TROCHOID, in geometry, a curve more generally known by the name of cycloid. See the article CYCLOID.

TROCHUS,

TROCHUS, in the natural hiſtory of ſhell-fiſh, a name given to ſeveral ſpecies of the flat-mouthed cochlæ. See COCHLEA.

Theſe ſhells have got the name trochus, from their reſembling the figure of the top, with which boys play. See plate CCLXXXV. fig. 4. where n° 1. repreſents the rough trochus, n° 2. the wavy trochus, and n° 3. the ſmooth trochus.

TROGLODYTES, in the antient geography, a people of Ethiopia, ſaid to have lived in caves under ground. Pom. Mela gives a ſtrange account of the Troglodytes: he ſays, they did not ſo properly ſpeak as ſhriek, and that they lived on ſerpents.

TROJA, a town of Italy in the kingdom of Naples, and province of the Capitinate, ſituated fifty-five miles north-eaſt of Naples.

TROJA, or TROJAN GAMES, were games ſaid to be inſtituted by Aſcanius, ſon of Æneas, and afterwards kept up by the Romans with great ſolemnity. They were celebrated by companies of boys, neatly dreſſed, and furniſhed with little arms and weapons, who muſtered in the public circus. They were choſen, for the moſt part, out of the nobleſt families of Rome, and the captain of them had the honourable title of princeps juventutis, being ſometimes next heir to the empire, and ſeldom leſs than the ſon of a principal ſenator. A particular account of theſe games may be ſeen in the fifth Æneid of Virgil, beginning at verſe 545.

TROIS RIVIERES, a town of north America, in the province of Canada, ſituated on the river of St. Laurence, fifty miles ſouth of Quebec: weſt long. 75°, and north lat. 46° 45′.

TROKI, a town of Poland, in Lithuania, ſituated on a lake, fifteen miles weſt of Wilna: eaſt lon. 25°, and north lat. 55°.

TRONAGE, an antient cuſtomary toll, paid for weighing of wool. This word is particularly mentioned in a charter granted to the mayor and citizens of London; in which city there is an officer called tronator, whoſe buſineſs it is to weigh the wool that is brought thither.

TRONCONNEE, in heraldry, denotes a croſs, or other thing, cut in pieces and diſmembered, yet ſo as all the pieces keep up the form of a croſs, though ſet at a ſmall diſtance from one another.

TRONE WEIGHT, the ſame with what we now call troy weight. See WEIGHT.

TROOP, a ſmall body of horſe or dragoons, about fifty or ſixty, ſometimes more, ſometimes leſs; commanded by a captain. Each troop, beſides a captain, has a lieutenant, cornet, quarter-maſter, and three corporals, who are the loweſt officers of a troop.

To beat the TROOP, is the ſame as beating the aſſembly. See ASSEMBLY.

TROPÆOLUM, the INDIAN CRESS, in botany, a genus of the *octandria-monogynia* claſs of plants, the flower of which conſiſts of five roundiſh petals inſerted into the diviſions of the cup; the two upper petals are ſeſſile; the three others have very long and barbated ungues; the fruit conſiſts of three convex capſules, ſulcated and ſtriated on one ſide, and angular on the other; the ſeeds are three, gibbous on one ſide, and angulated on the other, but upon the whole ſomewhat roundiſh, and ſtriated deeply. See plate CCLXXXV. fig. 3.

This genus comprehends the cardamindum of authors.

TROPE, in rhetoric, a kind of figure of ſpeech, whereby a word is removed from its firſt and natural ſignification, and applied with advantage to another thing, which it does not originally mean; but only ſtands for it, as it has a relation to, or connexion with it: as in this ſentence, *God is my rock*. Here the trope lies in the word *rock*, which being firm and immoveable, excites in our minds the notion of God's unfailing power, and the ſteady ſupport which good men receive from their dependence upon him. See the article FIGURE.

Tropes are uſed for the ſake of an agreeable variety; they divert the mind, and revive attention, when it begins to flag and be weary. In many caſes there is an abſolutely neceſſity for the writer or ſpeaker to repeat the ſame thing ſeveral times; therefore, to prevent the tireſome repetition of the ſame words, he carefully diverſifies his expreſſions, and judiciouſly intermixes plain and figurative language. Tropes add a wonderful ornament and ſtrength to a diſcourſe, and often give the mind a brighter and ſtronger idea of a thing, than proper words; Thus Virgil calling the two Scipios the *thunder-bolts of war*, repreſents the rapid ſpeed and victorious progreſs of their arms more emphatically, than all the plain terms of the roman language could have done. In order to make uſe of tropes ſeaſonably, and with advantage, the following rules ſhould be obſerved 1. Be ſparing and cautious in the uſe of them,

and omit them when they are not either as plain as proper words, or more expreſſive: tropes are the riches of a language, and it will be an imputation upon a man to laviſh them away without diſcretion. 2. Care muſt be taken, that tropes hold a proportion to the ideas intended to be raiſed by them; there ought to be an eaſy and unforced relation betwixt the trope and the proper word it is put for, or the thing intended to be expreſſed by it: when there is not this ſuitableneſs and relation, the expreſſion at beſt will not only be harſh and unpleaſant, but often ridiculous and barbarous. In order to preſerve this relation, a trope ought not to expreſs more or leſs than the thing requires; and things capable of heightening or ornament ought not to be debaſed nor vilified by low expreſſions; nor ſmall matters over-magnified by pompous and ſwelling words. 3. A trope ought to be obvious and intelligible, and therefore muſt not be fetched from things too remote, ſo as to require much reading and learning to apprehend it.

TROPEA, a town of Italy in the kingdom of Naples, and further Calabria, ſituated on the Tuſcan ſea, forty miles north of Reggio.

TROPES, a port-town of France, in Provence, ſituated on the Mediterranean, thirty miles eaſt of Toulon.

TROPHY, *tropæum*, among the antients, a pile or heap of arms of a vanquiſhed enemy, raiſed by the conqueror in the moſt eminent part of the field of battle. The trophies were uſually dedicated to ſome of the gods, eſpecially Jupiter. The name of the deity to whom they were inſcribed, was generally mentioned, as was that alſo of the conqueror. The ſpoils were at firſt hung upon the trunk of a tree; but inſtead of trees, ſucceeding ages erected pillars of ſtone, or braſs, to continue the memory of their victories. To demoliſh a trophy was looked upon as a kind of ſacrilege, becauſe they were all conſecrated to ſome deity.

The repreſentation of a trophy is often to be met with on medals of the roman emperors, ſtruck on occaſion of victories; wherein, beſides arms and ſpoils, are frequently ſeen one or two captives by the ſides of the trophy.

TROPHY-MONEY, denotes certain money annually raiſed in the ſeveral counties of the kingdom, towards providing harneſs, and maintaining the militia.

TROPICS, in aſtronomy and geography, are two circles ſuppoſed to be drawn on each ſide of the equinoctial, and parallel thereto. That on the north ſide of the line is called the tropic of cancer, and the ſouthern tropic has the name of capricorn, as paſſing through the beginning of thoſe ſigns. They are diſtant from the equinoctial 23° 29′. Two circles drawn at the ſame diſtance from the equator on the terreſtrial globe, have the ſame names in geography, and they include that ſpace or part of the ſphere, which is called the torrid zone, becauſe the ſun is, at one time or other, perpendicular over every part of that zone, and extremely torrifies or heats it. See the article ZONE.

TROPPAW, a city of Sileſia, ſeventy miles ſouth of Breſlaw.

TROVER, in law, an action which a man hath againſt one that, having found any of his goods, refuſeth to deliver them upon demand.

TROUGH *of the ſea*, is the hollow or cavity made between two waves or billows, in a rolling ſea.

TROUSSEQUIN, in the manege, an arch of wood raiſed above the hinder bow of a great ſaddle, in order to keep the bolſters firm.

TROUT, *trutta*, in ichthyology, the engliſh name of ſeveral ſpecies of ſalmo. See the article SALMO.

The common river-trout is, like the ſalmon, an inhabitant of the ſea or rivers indifferently: it is ſpotted with red, and its lower jaw is ſomewhat the largeſt; its tail is not forked, but hollowed in form of an arch of a circle. It is a very beautiful fiſh, and is, with juſtice, greatly eſteemed at our tables.

Beſides this, there are ſpecies of ſalmo, known by the names of ſalmon-trout and lake-trout.

For the method of fiſhing for trout, ſee the article FISHING.

TROWBRIDGE, a market-town of Wiltſhire, eighteen miles north-weſt of Saliſbury.

TROY WEIGHT, in commerce. See the article WEIGHT.

TROYES, a city of Champain, in France, ſituated on the river Seyne, ſeventy miles ſouth-eaſt of Paris. eaſt longit. 4° 5′, and north lat. 48° 15′.

TRUCE, in the art of war, denotes a ſuſpenſion of arms, or a ceſſation of hoſtilities between two armies, in order to ſettle articles of peace, bury the dead, or the like.

TRUCHMAN,

TRUCHMAN, DRAGOMAN, or DROGMAN, in the countries of the Levant, ſignifies an interpreter. See DRAGOMAN.

TRUCKS, among gunners, round pieces of wood, in form of wheels, fixed on the axle-trees of carriages, to move the ordnance at ſea, and ſometimes alſo at land.

TRUE, ſomething agreeable to the reality of things, or to truth.

TRUE *place of a planet*, or *ſtar*, in aſtronomy, is a point of the heavens, ſhewn or pointed out by a right line, drawn from the center of the earth, through the center of the planet or ſtar. See PLANET, *&c.*

TRUEN, or TRON, a town of the biſhopric of Liege, in Germany, twenty miles ſouth-eaſt of Louvain.

TRUFFLES, *tubera terræ*, in natural hiſtory, a kind of ſubterraneous vegetable production, not unlike muſhrooms, being a genus of fungi, which grows under the ſurface of the earth. See FUNGUS.

The truffle is only a fleſhy tubercle, covered with a hard ſort of cruſt, rough, and ſomewhat regularly furrowed, on the ſurface almoſt like the cypreſs-nut. It does not riſe above the ſurface of the earth, but lies concealed about half a foot below it. Great numbers of them are found in the ſame place, of different ſizes: ſome of them are now and then found of a pound weight, or even a pound and a quarter; theſe laſt are but rare, and Pliny only mentions their being of a pound weight.

They grow at the feet and under the ſhades of trees, ſometimes about the roots of ſtones, and ſometimes in clear earth. Their favourite trees are either the white or green oak, as the elm is that of the morellæ. They begin to be found when warm weather firſt ſucceeds the cold, ſooner or later, as the ſeaſon is more or leſs mild; for they have ſometimes been very rare after hard winters. At firſt they appear only like little round peas, red without, and white within. Theſe peas grow larger by degrees; from that time they take out of the ground what they commonly call white truffles; theſe are of themſelves inſipid, and people dry them as an ingredient for ragouts, becauſe they keep better when dried, than marbled ones do. It is a common opinion, that truffles which have been once removed from their places, are never after capable of being nouriſhed, even when put in ſome earth from which they were originally taken: but if one leave them there for a certain ſeaſon, without diſturbing them, they grow inſenſibly larger, their bark becomes black, rough, and unequal, though they always retain their whiteneſs within. Hitherto they have very little ſmell or taſte, and can only be uſed in ragouts: theſe are always called the firſt white truffles, and are not to be made a different ſpecies from the marbled or black ones gathered in the end of autumn, and even in the winter after the froſts are begun.

When the truffles are at maturity, they have a very good ſmell and taſte; and are fit to be dug from the month of October to the end of December; and ſometimes to the end of February and March, when they are even at that time marbled; whereas thoſe, gathered from the month of April till July and Auguſt, are only white. If people neglect to gather the truffles when arrived at a due degree of maturity, they rot; and then we may obſerve the re-production of the truffle; becauſe, after ſome time, we ſee ſeveral bunches of other young truffles filling up the places of the rotten ones. Theſe young truffles are nouriſhed till the firſt colds come on; and if the froſts are not intenſe, they get over the winter, and furniſh us betimes with the freſh green truffles.

As to the virtues of truffles, the common opinion is, that they are hot: Galen, however, according to Matthiolus, looks upon them as indifferent, and the baſis of all other ſeaſoning; and, indeed, it is to this purpoſe that they are uſed in all ragouts. Avicenna ſpeaks of them in a manner quite different, and ſays, they engender thick humours more than any other food; that they are hard of digeſtion, heavy on the ſtomach, and, when much uſed, have a tendency to bring on an apoplexy and palſy. Theſe two authors may be reconciled, if we conſider two qualities in the truffle, which are capable of producing two different effects: firſt, they may prove hot of themſelves, by emitting their volatile ſalts into the ſtomach; or by being mixed with ſalt, pepper, and other ſpices, which they drink up like a ſponge. In the ſecond place, they may prove of hard digeſtion, when eaten immoderately by a perſon of a weak ſtomach. in which caſe they produce bad effects, ſtagnate, and form themſelves into a glareous ſubſtance, which diſorders the ſtomach, and which may be occaſioned by the cold quality aſcribed to them by Galen. As a proof that the truffle is of hard digeſtion, it has this in

common

common with other fruits, that it grows hard in ſpirit of wine, and is with difficulty diſſolved in water.

TRUGILLO, a town of Terra Firma, in ſouth America: weſt lon. 69° 30′, and north lat. 7° 16′.

TRUMPET, a muſical inſtrument, the moſt noble of all portable ones of the wind kind, uſed chiefly in war among the cavalry, to direct them in the ſervice.

Marine TRUMPET, is a muſical inſtrument conſiſting of three tables, which form its triangular body. It has a very long neck, with one ſingle ſtring, very thick, mounted on a bridge, which is firm on one ſide, but tremulous on the other. It is ſtruck by a bow with one hand, and with the other the ſtring is preſſed, or ſtopped, on the neck by the thumb. It is the trembling of the bridge, when ſtruck, that makes it imitate the ſound of a trumpet; which it does to that perfection, that it is ſcarce poſſible to diſtinguiſh the one from the other: and this is what has given it the denomination of marine trumpet; though, in propriety, it is a kind of monochord.

Harmonical TRUMPET, an inſtrument that imitates the ſound of a trumpet; which it reſembles in every thing, excepting that it is longer, and conſiſts of more branches: it is generally called ſackbut.

Speaking TRUMPET, is a tube from ſix to ſixteen feet long, made of tin, perfectly ſtraight, and with a very large aperture; the mouth-piece being big enough to receive both lips.

The ſpeaking-trumpet, or ſtentorophonic tube, as ſome call it, is uſed for magnifying of ſound, particularly that of ſpeech, and thus cauſing it to be heard at a great diſtance: how it does this, will be eaſy to underſtand from the ſtructure thereof, thus illuſtrated by the ingenious Mr. Martin: let ABC (pl. CCLXXXV. fig. 5. n° 1.) be the tube, BD the axis, and B the mouth-piece for conveying the voice to the tube.

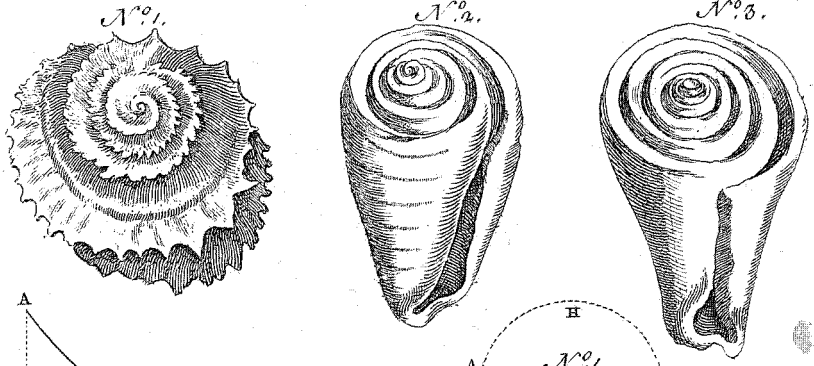
Then it is evident, when a perſon ſpeaks at B, in the trumpet, the whole force of his voice is ſpent upon the air contained in the tube, which will be agitated thro' the whole length of the tube; and by various reflections from the ſide of the tube to the axis, the air along the middle part of the tube will be greatly condenſed, and its momentum proportionably increaſed; ſo that, when it comes to agitate the air at the orifice of the tube AC, its force will be as much greater than what it would have been without the tube, as the ſurface of a ſphere, whoſe radius is equal to the length of the tube, is greater than the ſurface of the ſegment of ſuch a ſphere, whoſe baſe is the orifice of the tube. See SOUND.

For a perſon ſpeaking at B, without the tube, will have the force of his voice ſpent in exciting concentric ſuperficies of air all around the point B; and, when thoſe ſuperficies or pulſes of air are diffuſed as far as D, every way, it is plain the force of the voice will be diffuſed through the whole ſuperficies of a ſphere whoſe radius is BD; but in the trumpet it will be ſo confined, that, at its exit, it will be only diffuſed thro' ſo much of that ſpherical ſurface of air, as correſponds to the orifice of the tube. But, ſince the force is given, its intenſity will be always inverſely, as the number of particles it has to move; and therefore, in the tube, it will be to that without, as the ſuperficies of ſuch a ſphere to the area of the large end of the tube, nearly.

To make this matter yet plainer by calculation, let BD = 5 feet, then will the diameter of the ſphere DE = 10 feet, the ſquare of which is 100, which, multiplied by 0,7854, gives 78,54 ſquare feet for the area of a great circle AHEFC. And, therefore, four times that area, *viz.* 4×78,54 = 314,16 = ſquare feet in the ſuperficies of the aerial ſphere. If now the diameter AC, of the end of a trumpet, be one foot, its area will be 0,7854; but 7854: 314,16 :: 1 : 400, therefore the air at the diſtance of BD, will be agitated by means of the trumpet, with a force 400 times greater than by the bare voice alone. Again, it is farther evident how inſtruments of this form aſſiſt the hearing greatly; for the weak and languid pulſes of the air being received by the large end of the tube, and greatly multiplied and condenſed by the tremulous motion of the parts of the tube, and air agitated by them, are conveyed to the ear by the ſmall end, and ſtrike it with an impetus as much greater than they would have done without it, as the area of the ſmall end at B, is leſs than the area of the large end AC. From what has been ſaid, it is evident the effect of the tube in magnifying ſound, either for ſpeaking or hearing, depends chiefly upon the length of the tube. But yet ſome advantage may be derived from the particular ſhape thereof. Some very eminent philoſophers have propoſed the figure which is made by the revolution of a parabola

Fig. 1. The Tiger-Shell. Fig. 2. Trewia. Fig. 3. Tropæolum

Fig. 4. Trochus



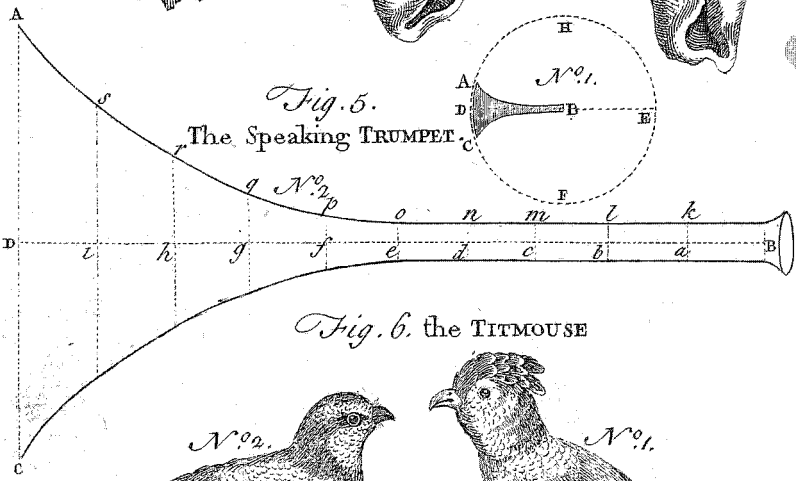
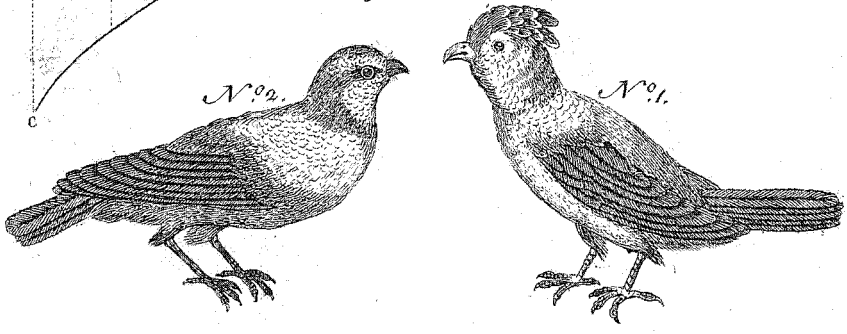


Fig. 5. The Speaking Trumpet.

Fig. 6. the Titmouse



J. Jefferys sculp

parabola about its axis, as the beſt of any, where the mouth-piece of the parabola, and, conſequently, the ſonorous rays, will be reflected parallel to the axis of of the tube.

But this parallel reflection ſeems no way eſſential to the magnifying of ſound; on the contrary, it appears rather to hinder ſuch an effect, by preventing the infinite number of reflections and reciprocations of ſound; in which, according to ſir Iſaac Newton, its augmentation doth principally conſiſt. For all reciprocal motion, in every return, is augmented by its generating cauſe, which is here the tremulous motions of the parts of the tube. Therefore, in every repercuſſion from the ſides of the tube, the agitations and pulſes of confined air muſt neceſſarily be increaſed; and, conſequently, this augmentation of the impetus of the pulſes muſt be proportional to the number of ſuch repercuſſions; and, therefore, to the length of the tube, and to ſuch a figure as is moſt productive of them. Whence it appears, that the parabolic trumpet is, of all others, the moſt unfit for this purpoſe, inſtead of being the beſt.

But there is one thing more which contributes to the augmenting of theſe agitations of air in the tube, and that is the proportion which the ſeveral portions of air bear to each other, when divided by tranſverſe ſections, at very ſmall but, equal diſtances, from one end of the tube to the other. Thus, let thoſe ſeveral diviſions be made at the points *a*, *b*, *c*, *d*, *e*, &c. (*ibid.* n° 2.) in which let the right lines *ak*, *bl*, *cm*, *dn*, &c. be taken in geometrical proportion. Then will the portions of air contained between B and *a*, *a* and *b*, *b* and *c*, *c* and *d*, &c. be very nearly in the ſame proportion, as being in the ſame ratio with their baſes, when the points of diviſion are indefinitely near together.

But, when any quantity of motion is communicated to a ſeries of elaſtic bodies, it will receive the greateſt augmentation when thoſe bodies are in geometrical proportion. Therefore, ſince the force of the voice is impreſſed upon, and gradually propagated through, a ſeries of elaſtic portions of air in a geometrical ratio to each other, it ſhall receive the greateſt augmentation poſſible.

Now, ſince by conſtruction it is $Ba = ab = bc = cd$, &c. and alſo $ak : bl :: bl : cm :: cm : dn$, and ſo on; therefore, the points *k*, *l*, *m*, *n*, *o*, *p*, *q*, *r*, *s*, A, will, in this caſe, form that curve line, which is called the logarithmetic curve; conſequently, a trumpet, formed by the revolution of this curve about its axis, will augment the ſound in a greater degree than any other figured tube whatever.

Liſtening, or *Hearing* TRUMPET, an inſtrument to aſſiſt hearing. See the article HEARING.

TRUMPET-FLOWER, *bignonia*, in botany. See the article BIGNONIA.

TRUMPET-SHELL, the engliſh name of the buccinum of authors. See the article BUCCINUM.

TRUNCATED, in general, is an appellation given to ſuch things as have, or ſeem to have, their points cut off: thus we ſay, a truncated cone, pyramid, leaf, &c. See CONE, PYRAMID, &c.

TRUNCHEON, a ſhort ſtaff, or battoon, uſed by kings, generals, and great officers, as a mark of their command.

TRUNDLE, a ſort of carriage with low wheels, whereon heavy and cumberſome burdens are drawn.

TRUNDLE-SHOT. See SHOT.

TRUNK, *truncus*, among botaniſts, denotes the ſtem, or body, of a tree; or, that part between the ground and the place where it divides into branches.

In anatomy, trunk is uſed for the buſto of a human body, excluſive of the head and limbs, comprehending the abdomen and thorax. See the articles ABDOMEN and THORAX.

Trunk is alſo uſed for the main body of an artery, or vein, in contradiſtinction to the branches and ramifications thereof.

Trunk-roots of a plant, are little roots which grow out of the trunks of plants.

Theſe are of two kinds: 1. Such as vegetate by a direct deſcent, the place of their eruption being ſometimes all along the trunk, as in mints, &c. and ſometimes only in the utmoſt point, as in brambles.

2. Such as neither aſcend nor deſcend, but ſhoot forth at right angles to the trunk; which, therefore, though as to their office they are true roots, yet, as to their nature, are a medium between a trunk and a root.

TRUNNIONS, or TRUNIONS *of a piece of ordnance*, are thoſe knobs or bunches of the gun's metal, which bear her up on the cheeks of the carriage: and hence the trunnion-ring is the ring about a cannon, next before the trunnions.

TRURO, a borough of Cornwal, ſituated thirty-two miles north-eaſt of the land's-end.

It ſends two members to parliament.

TRUSS, *truſſa*, a bundle, or certain quantity of hay, ſtraw, *&c.*

A truſs of hay is to contain fifty-ſix pounds, or half an hundred weight; thirty-ſix truſſes make a load. In June and Auguſt the truſs is to weigh ſixty pounds, on forfeiture of eighteen ſhillings per truſs.

A truſs of forage is as much as a trooper can carry on his horſe's crupper.

TRUSS *of flowers*, is uſed, by floriſts, to ſignify many flowers growing together on the head of a ſtalk, as in the cowſlip, auricula, *&c.*

TRUSS is alſo uſed for a ſort of bandage or ligature, made of ſteel, or the like matter, wherewith to keep up the parts, in thoſe who have hernias or ruptures. See the article HERNIA.

In plate CCLXXXVI. are repreſented various kinds of truſſes, to compreſs the parts, and prevent a relapſe of the inteſtine after the rupture has been cured. Some of theſe, as fig. 2, 8, and 9, are made of callicoe, for infants; or of leather, for adults. Others, as fig. 1, 3, 4, and 11, are made of ſteel covered with leather. Some are made of ſteel plates, joined by hinges, ſo as to be flexible and more eaſy, as in fig. 11. Some again are deſigned for ruptures on both ſides; as fig. 4 and 5. Some are for ruptures on the right ſide, as fig. 2 and 3: others for the left, as 1, 9, 10, and 11. Some, again, are faſtened to the body by tagged-laces; as fig. 5, 6, and 9: others by ſtraps and buckles; as fig. 2, 5, and 9: others by hooks and eyes, or hooks and ſtraps; as fig. 1, 3, 4, and 11: and others again by different contrivances; as in fig. 7 and 8.

In all theſe truſſes, A denotes the bolſter, or compreſs, which is applied to the ring of the abdominal muſcles, after the rupture has been reduced: BB, the girdle or belt of the truſs, to be faſtened round the body, either with ſtrings CC, paſſed through the holes DD; or by ſtraps and buckles; as in fig. 2 and 10, marked EE: or with hooks, as in fig. 1, 3, 4, and 11, marked *aa*. In many of theſe truſſes there is a depending girt, beſides that which paſſes round the body, which is to be paſſed between the legs of women, and faſtened to the oppoſite part of the belt: as FF in fig. 1, 2, 6, 7, 8, 9, and 10. In fig. 6 is ſhewn the bolſter *a*; and in fig. 7 may be ſeen a wooden bolſter *cd*, *ee* being the button by which it is faſtened to the truſs, and *d* the convex part by which it is applied to the rupture.

There are a multitude of other truſſes, of various forms, contrived by thoſe who make it their buſineſs; but we have here given figures of the beſt of them, from Heiſter's ſurgery, P. II. p. 71 and 72.

TRUSSES, in a ſhip, are ropes made faſt to the parrels of a yard, either to bind the yard to the maſt when the ſhip rolls, or to hale down the yards in a ſtorm, *&c.*

TRUSSING, in falconry, is a hawk's raiſing any fowl, or prey, aloft; firſt ſoaring up, and then deſcending with it to the ground.

TRUST, in law, ſignifies, in general, that confidence which one perſon repoſes in another; and in caſe of non-performance, or breach of this truſt, the remedy is by bill in equity, as the common-law uſually takes no notice of truſts.

Conveyances made in the way of truſt, which were formerly invented to evade the ſtatute of uſes, are not ſo much favoured as plain and direct deeds. All declarations of truſts of lands, *&c.* are to be in writing, and ſigned by the parties. It has been decreed in chancery, that a fine and recovery of a ceſtuiqui truſt ſhall bar and transfer the eſtate, as they ſhould an eſtate at law, where the ſame were levied or ſuffered on good conſideration. And there is a ſtatute whereby an infant ſeiſed of an eſtate in fee in truſt, is enabled to make any conveyance thereof, by order of the court of chancery.

TRUSTEE, one who has an eſtate, or money, put or truſted in his hands, for the uſe of another.

Where two or more perſons are appointed truſtees, if one of them only receives all or the greateſt part of the profits of the lands, *&c.* and is in arrear, and unable to ſatisfy the perſon to whom he is ſeiſed in truſt, the other, in that caſe, ſhall not be anſwerable for more than comes to his hands.

TRUTH, *veritas*, a term uſed in oppoſition to falſhood, and applied to propoſitions which anſwer, or accord, to the nature and reality of the thing whereof ſomething is affirmed or denied.

Truth, according to Mr. Locke, conſiſts in the joining or ſeparating of ſigns, as the things ſignified by them do agree or diſagree

TRUSSES

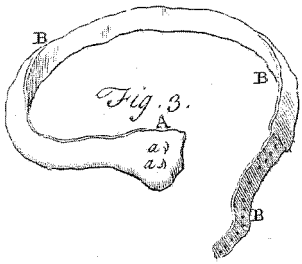


Fig. 3.

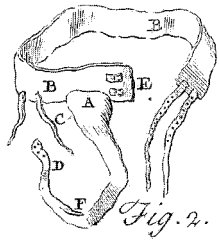


Fig. 2.

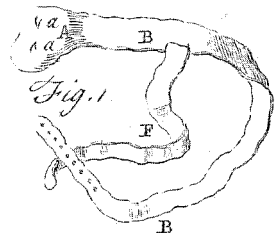


Fig. 1.

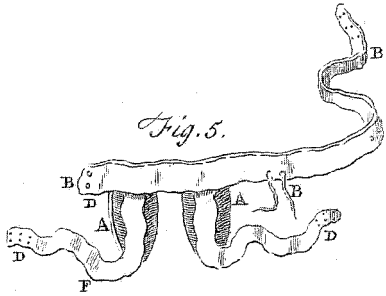


Fig. 5.

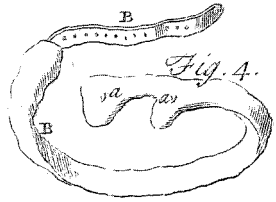


Fig. 4.

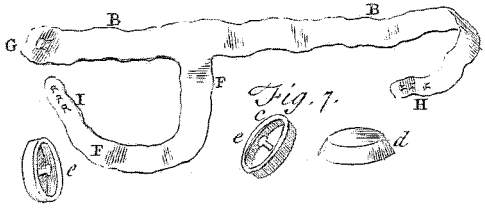


Fig. 7.

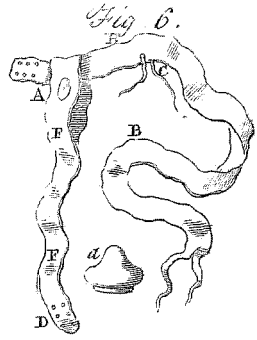


Fig. 6.

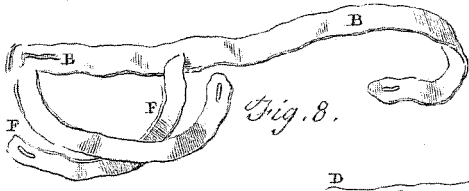


Fig. 8.

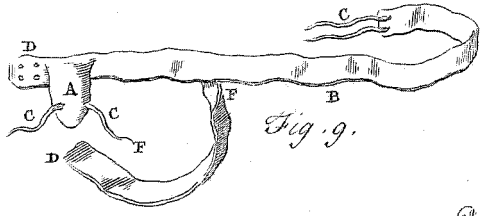


Fig. 9.

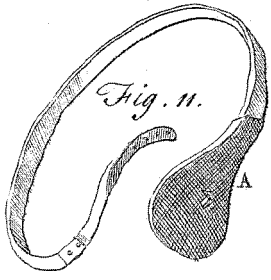


Fig. 11.

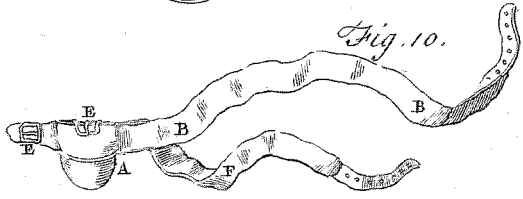


Fig. 10.

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Fig. 1. TUBES

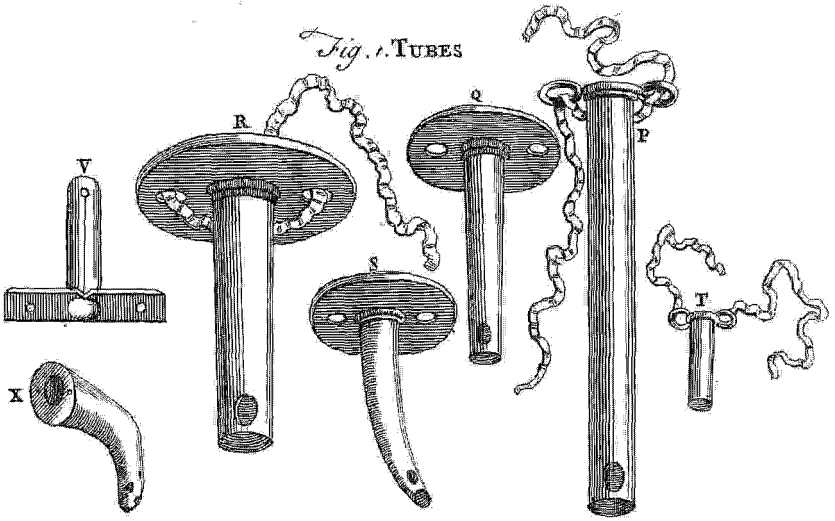
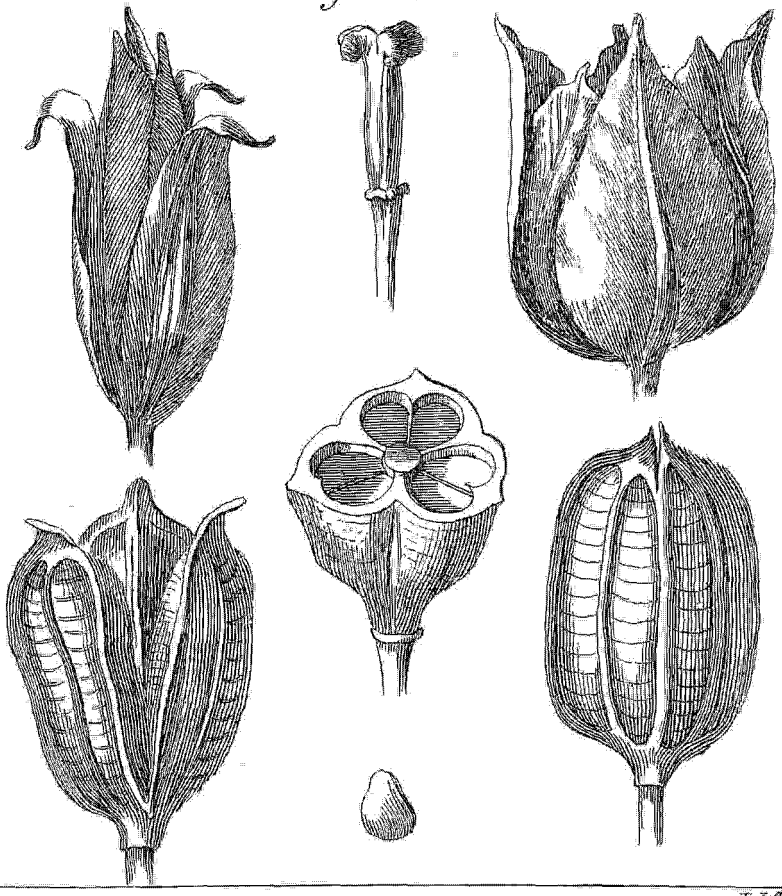


Fig. 2. TULIP.



diſagree one with another. Now the joining or ſeparating of ſigns is what we call making of propoſitions. Truth then, properly, relates only to propoſitions, whereof there are two ſorts, mental and verbal; as there are two ſorts of ſigns commonly made uſe of, *viz.* ideas and words. See IDEA, WORD, *&c.* Mental propoſitions are thoſe wherein the ideas in our underſtanding are put together, or ſeparated, by the mind perceiving or judging of their agreement or diſagreement.

Verbal propoſitions are words put together, or ſeparated, in affirmative or negative ſentences: ſo that a propoſition conſiſts in joining or ſeparating of ſigns; and truth conſiſts in putting together, or ſeparating thoſe ſigns, according as the things they ſtand for agree or diſagree. See PROPOSITION.

Moral TRUTH, conſiſts in ſpeaking things according to the perſuaſion of our minds, and is called alſo veracity.

Metaphyſical, or *tranſcendental* TRUTH, is nothing but the real exiſtence of things conformable to the ideas which we have annexed to their names.

TRUTINATION, the act of weighing or ballancing a thing. See the article BALLANCE.

TRUXILLO, a town of Eſtremadura, in Spain, one hundred miles ſouth-weſt of Toledo: weſt long. 6°, north lat. 39° 12′.

TRUXILLO is alſo a town of Terra-Firma, ſituated in weſt long. 69°, and north lat. 9° 15′.

TRUXILLO is likewiſe a port-town of Mexico, ſituated on the gulph of Honduras: weſt long. 88° 30′, north lat. 15° 30′.

TRY, in the ſea-language. A ſhip is ſaid to try, or lie a-try, when no ſails are abroad but the main-ſail or mizzen-ſail.

TUB, in commerce, denotes an indeterminate quantity or meaſure: thus, a tub of tea contains about ſixty pounds; and a tub of camphor from fifty-ſix to eighty pounds.

TUBE, *tubus*, in general, pipe, conduit, or canal; a cylinder hollow within-ſide, either of lead, iron, wood, glaſs, or other matter, for the air, or ſome other fluid, to have a free paſſage, or conveyance, through. See PIPE, *&c.*

Small ſilver or leaden tubes are frequently uſed, by ſurgeons, to draw off blood, matter, or water, from the different parts of the body; they are made of various ſizes and ſhapes, as repreſented in plate CCLXXXVII. fig. 1. at the letters P, Q, R, S, T, V, X; the uſes of which will be ſhewn more at large under the articles WOUND, PARACENTESIS, *&c.*

TUBE, in aſtronomy, is ſometimes uſed for a teleſcope, or, more properly, for that part thereof into which the lenſes are fitted, and by which they are directed and uſed. The goodneſs of the tube being of great importance to that of the teleſcope, we ſhall here add its ſtructure.

The conſtruction of a draw TUBE *for a teleſcope.* The chief points to be regarded here are, that the tube be not troubleſome by its weight, nor liable to warp and diſturb the poſition of the glaſſes; ſo that every kind of tube will not ſerve in every caſe. See TELESCOPE.

1. If the tube be ſmall, it is beſt made of thin braſs-plates covered with tin, and formed into pipes or draws, to ſlide within one another.

2. For long tubes, iron would be too heavy, for which reaſon ſome chuſe to make them of paper, thus: A wooden cylinder is turned, of the length of the paper to be uſed, and of a diameter equal to that of the ſmalleſt draw: about this cylinder is rolled paper till it be of a ſufficient thickneſs; when one pipe is dry provide others after the ſame manner, ſtill making the laſt ſerve for a mould to the next, till you have enough for the length of the tube deſired. Laſtly, to the extremes of the draws are to be glewed wooden ferrils, that they may be drawn forth the better.

3. Since paper draws are apt to ſwell with moiſt weather, ſo as to ſpoil their ſliding; and in dry weather to ſhrink, which renders them looſe and tottering; in both which caſes the ſituation of the lens is eaſily diſturbed; the beſt method of making of tubes is as follows: Glue parchment round a wooden cylinder, and let the parchment be coloured black, to prevent the reflecting rays making any confuſion: provide very thin ſlits of beech, and bending them into a cylinder glue them carefully to the parchment; cover this wooden caſe with white parchment, and, about its outer extreme, make a little ring or ferril: after the ſame manner make another draw over the former, and then another, till you have enough for the length of the tube.

To the inner extremes of each draw fit a wooden ferril, that the ſpurious rays, ſtriking againſt the ſides, may be inter-

cepted and loſt. In theſe places where the lenſes are to be put, it will be proper to furniſh the ferrils with female ſcrews. Provide a wooden cover to defend the object-glaſs from the duſt; and, putting the eye-glaſs in its wooden ferril, faſten it by the ſcrew to the tube. Laſtly, provide a little wooden tube of a length equal to the diſtance the eye glaſs is to be from the eye, and fit it to the other extreme of the tube.

TUBE-FISH, the TRIGLA with a prickly-head, and with three appendages at each of the pectoral fins. See the article TRIGLA.

TUBER, or TUBERCLE, in botany, a kind of round turgid root, in form of a knob or turnip.

The plants which produce ſuch roots are hence denominated tuberoſe, or tuberous, plants.

TUBER, or TUBEROSITY, in medicine, is uſed for a knob, or tumour, growing naturally in any part; in oppoſition to tumours, which ariſe accidentally, or from diſeaſe.

TUBERA TERRÆ, TRUFFLES, in botany. See TRUFFLES.

TUBERCLES, among phyſicians, denote little tumours which ſuppurate and diſcharge pus, and are often found in the lungs, eſpecially of conſumptive perſons. See CONSUMPTION and PHTHISIS.

TUBEROUS, or TUBEROSE-ROOTS, in botany. See TUBER.

TUBINGEN, a city of Swabia, in Germany, ſituated on the river Neckar, in the dutchy of Wirtemburg: eaſt long. 8° 55′, north lat. 48° 26′.

TUBIPORA, or TUBULARIA, a genus of ſubmarine plants, belonging to the *cryptogamia* claſs, of the hardneſs of coral, and conſiſting of cylindric tubes riſing from a thin cruſt of the ſame ſort of matter with themſelves.

TUBULI FOSSILES, in natural-hiſtory, the tubules, or caſes of ſea-worms, found buried in the earth. They are met with of various ſizes, ſometimes complete, and buried in the ſtrata of earth or ſtone; ſometimes they are more or leſs perfect, and are immerſed in maſſes of the ludus helmontii or ſeptariæ, and in this ſtate they make one kind of lapis ſyringoides, or pipe-ſtone; but the moſt beautiful ſyringoides, or pipe-ſtones, are the parts of the bottoms of ſhips, or poſts fixed in the ſea, which have been pierced, in their original ſtate of wood, by theſe ſea worms, and afterwards ſtriked with the caſes or tubuli of the worms remaining in them; theſe are uſually of a pale-yellow or whitiſh-wax colour, and the body of the maſs of a browniſh or blackiſh hue, but retaining the ſtructure of the wood: of theſe there are beautiful ſpecimens in great abundance on the ſhore of the iſland Sheppy. We have the very ſame ſubſtances alſo buried in our clay-pits, about London and at Richmond; but in theſe the wood is highly ſaturated with the matter of the common vitriolic pyrites, and the pipes often filled with the ſame ſubſtance. See SYRINGOIDES.

TUBULI LACTIFERI, in anatomy, the ſmall tubes, or veſſels, through which the milk flows to the nipples of women's breaſts. See the article MILK.

TUBULUS MARINUS, or CANALIS, in natural-hiſtory, a genus of univalve ſhells, of an oblong figure, terminating in a point, and hollow within, ſo as to reſemble a tube or horn; and hence have, by ſome old writers, been called dentalia. See DENTALIA.

Of theſe ſhells ſome are ſtriated, ſome ſtraight, ſome bent like a horn, and ſome in form of a creſcent.

TUCANA, the TOUCAN, in ornithology. See the article TOUCAN.

TUCK *of a ſhip*, the truſſing or gathering up the quarter under water; which if ſhe lie deep, makes her have a broad, or, as they call it, fat quarter, and hinders her ſteering, by keeping the water from paſſing ſwiftly to her rudder; and if this truſſing lie too high above the water, ſhe will want bearing for her works behind, unleſs her quarter be very well laid out.

TUCUMAN, the ſouth-weſt diviſion of the province of La Plata, or Paraguay, in ſouth America.

TUCUYO, a town of Terra-Firma: weſt long. 68° 30′, north lat. 7°.

TUDELA, a town of Navarre, in Spain, ſituated on the river Ebro, fifty-five miles ſouth of Pampeluna.

TULIP, *tulipa*, in botany, a genus of the *hexandria-monogynia* claſs of plants, with a campanulated flower, conſiſting of ſix oblong, hollow, and erect petals: the fruit is a triquetrous, and trilocular capſule, containing a great many flat ſeeds ranged in a double order. See plate CCLXXXVII. fig. 2.

The characters of a good tulip are, that the ſtem ſhould be ſtrong and tall; the flower ſhould conſiſt of ſix petals, three within and three without; and the former ſhould

ſhould be larger than the latter: the bottom of the flower ſhould be proportioned to the top, and the ends of the leaves ſhould be rounded, not pointed: the leaves, when opened, ſhould neither turn inward nor bend outward, but ſtand erect; and the whole flower ſhould be of a middling ſize, neither too large nor too ſmall. the ſtripes muſt be ſmall and regular, and ſhould all ariſe from the bottom of the flower: the chives alſo ſhould not be yellow but of a brown colour.

TULIP-TREE, *liriodendrum*, in botany. See the article LIRIODENDRUM.

TULLE, a town of France, in the province of Guienne: eaſt long. 1° 31′, north lat. 45° 23′.

TULN, a town of Germany, fifteen miles weſt of Vienna.

TUMEFACTION, the act of ſwelling or riſing into a tumour. See the next article.

TUMOUR, or TUMOR, in medicine and ſurgery, a preternatural riſing or eminence on any part of the body. Tumour is alſo defined, by phyſicians, a ſolution of continuity ariſing from ſome humour collected in a certain part of the body, which diſjoins the continuous parts, inſinuates itſelf between them, and deſtroys their proper form.

Whether there be any ſuch preternatural riſing or enlargement on any part of the body, may be diſcovered from inſpection, but more particularly by feeling. And, notwithſtanding, it is a general cuſtom to refer excreſcences, as warts, corns, and ſuch as grow in the noſe and pudenda, to the claſs of tumours; yet, becauſe they grow not from beneath, but out of, or upon, the ſkin itſelf, it is thought proper not to comprehend them in the general diviſion of tumors. See EXCRESCENCE, CORN, WART, *&c.*

There are tumours of various kinds, diſtinguiſhed by particular names, according to the different cauſes from whence they proceed, and the particular parts wherein they are ſeated; ſome are called hot, others cold and watry; ſome are termed windy, others ſcirrhous; and ſome are named benign, others malignant: but Heiſter finds fault with theſe diſtinctions. There are ſome tumours which being contained in a proper membrane, are therefore called cyſtic; and if this ſhould be in an artery, it is uſually termed aneuriſm; but when in a vein, a varix. When in the veins of the anus, or rectum, the diſorder is termed hæmorrhoids; but if the tumour be in the ſcrotum, unguen, or at the umbilicus, it is generally called a hernia: if any pus, or matter, is contained in the tumour, it is called an abſceſs; and if the tumour is ſeated in a bone, it is termed exoſtoſis. See the articles CYST, ANEURISM, VARIX, HÆMORRHOIDS, HERNIA, ABSCESS, and EXOSTOSIS.

The forementioned claſs of tumours are all of them ſubdivided into ſeveral other kinds: thus the hot and burning tumours, which are the ſame with inflammations, are generally termed phlegmons when violent and ſeated in the common integuments; but when ſlighter, they are commonly called furuncles. The inflammation which is not fixed deep, but ſpreads only ſuperficially upon the ſkin, is termed an eryſipelas: the inflammatory tumour that ariſes at the finger-ends is termed paronychia: that which fixes in the groin or armpits is called a bubo; and that under the ears a parotis. When an inflammation ſeizes the hands and feet from extreme cold, chilblains ariſe; which tumour is called pernio. See the articles INFLAMMATION, FURUNCLE, ERYSIPELAS, PARONYCHIA, BUBO, PAROTIDES, and PERNIONES.

TUMOURS *of the breaſts*. See the article INFLAMMATIONS *of the breaſts*.

Cancerous TUMOURS. See CANCER.

Encyſted TUMOURS, tumours ariſing in different parts of the body, but contained in certain membranous coats: theſe are ſometimes harder, ſometimes ſofter, of a paliſh colour, and uſually attended with little pain. Theſe tumours ariſe from obſtructions either in the glands, or in the adipoſe membrane, more eſpecially about the face and neck, where they occaſion great deformity. The membranous coat with which theſe tumours are inveſted, is often of a conſiderable thickneſs, and is uſually the coat of the diſordered gland, or ſome of the adipoſe cells. At their beginning they are uſually very ſmall and moveable; but encreaſing by ſlow degrees, they grow ſometimes to an enormous bulk. See the article CYST.

The conſiſtence of ſome of theſe tumours is ſoft and fluctuating, and of others more hard and firm. They are of all ſhapes and ſizes, and ſome of them become hard as a callus, and unmoveable, while others are, for the generality, ſoft and moveable. See CALLUS.

They

They are diſtinguiſhed according to the conſiſtence of their contents; ſome are called atheromata, from their contents reſembling paſte; others, which have them of the conſiſtence of honey, are called meliceres; but if they are of a fatty ſubſtance, like ſuet or lard, they are called ſteatomata. If they happen in a gland which becomes indurated, they are called ſchirrous: and laſtly, when they are of a fleſhy conſiſtence, they are called ſarcomata. Some of theſe tumours have been found alſo full of hair. See ATHEROMA, *&c.*

They are diſtinguiſhed by others according to the places where they are ſituated. Thoſe ſeated under the ſcalp are called talpa, teſtudo, or lupia. Thoſe in the neck, ſtrumæ or ſcrophulæ; and thoſe in the hands and feet, eſpecially if among the tendons, are called ganglions. See the article GANGLIO, *&c.*

There is no general method for the cure of them; but the ſurgeon, according to their different circumſtances, attempts this by diſcuſſion, ſuppuration, or extirpation. See the articles DISPERSION and SUPPURATION.

But if the tumour can neither be diſperſed nor ſuppurated, but continues to enlarge itſelf, it is adviſeable to extirpate it in order to prevent its turning into a cancerous nature. There are ſeveral methods in practice for extirpating theſe tumours according to their nature and ſize: thoſe which are ſmall and hard, or hung by a root as by a ſtalk, are generally beſt removed by ligature, in the manner of warts; by which means they wither and fall off of themſelves in a few days. But the moſt ready and expeditious method is to cut them off with a ſcalpel, and then heal up the wound: but if in removing them this way you divide a conſiderable artery, you may ſtop it by ſome potential, or even the actual, cautery; or elſe, by taking it up with a needle and thread. Laſtly, theſe tumours may be often removed by the application of cauſtic or corroding medicines, retained about the root by means of plaſters, compreſſes, and a bandage; and when you find the root of the tumour almoſt corroded through, the reſt may be divided by the ſcalpel. See the article CAUSTIC.

If the root of the encyſted tumour appears too large for it to be conveniently taken off by ligature, you muſt then remove it either by the knife or by the cauſtics, though the latter is uſually preferred. In order to extirpate it by the knife, you muſt firſt make a longitudinal inciſion upon the tumour; and if that does not appear ſufficient, make another inciſion acroſs the former, till you think the wound large enough for taking out the tumour; in order to which you next dilate the integuments, and ſeparate them from the cyſt of the tumour, which you are to take out whole, if poſſible, either by means of the ſcalpel, a hook, or by paſſing a crooked needle, with a ſtrong thread, croſswiſe under the tumour; but great caution is neceſſary in this operation, leſt any important part that is contiguous to the tumour be injured.

The tumour being thus carefully extracted, if the wound and hæmorrhage be ſmall you may preſs the lips together; and by covering the ſame with lint and compreſſes, retained with a proper bandage, the patient is cured in a few days time; but in caſe of a profuſe hæmorrhage the blood is to be ſtopped either by ligature, aſtringents, or the actual or potential cautery.

Funguous TUMOURS. See FUNGUS.

Inflammatory TUMOURS. See the article INFLAMMATION.

Oedematous TUMOURS. See OEDEMA.

TUMOURS *of the parotid glands.* See the article PAROTIDES.

Peſtilential TUMOURS. See the articles BUBO and CARUNCLE.

Scirrhous TUMOURS. See SCIRRHUS.

TUMOURS *of the teſticles.* See TESTICLES.

TUN, or TON, originally ſignifies a large veſſel or caſk of an oblong form, biggeſt in the middle, and diminiſhing towards its two ends, girt about with hoops, and uſed for ſtowing ſeveral kinds of merchandize, for convenience of carriage; as brandy, oil, ſugar, ſkins, hats, *&c.* This word is alſo uſed for certain veſſels of extraordinary bigneſs, ſerving to keep wine in for ſeveral years.

TUN is alſo a certain meaſure for liquids; as wine, oil, *&c.* See MEASURE.

TUN is alſo a certain weight whereby the burden of ſhips, *&c.* are eſtimated. See the article WEIGHT.

TUNA, in botany, the ſame with the cactus. See the article CACTUS.

TUNBRIDGE, a town of Kent, ſituated thirty-three miles weſt of Canterbury, much reſorted to on account of its excellent waters.

TUNE, or TONE, in muſic, that property of ſounds whereby they come under the relation of acute and grave to one another.

See

See the articles ACUTENESS, GRAVITY, TONE, and SOUND.

Though gravity and acuteneſs are mere terms of relation, the tune of the ſound is ſomething abſolute, every ſound having its own proper tone, which muſt be under ſome determinate meaſure in the nature of the thing.

The only difference then, between one tune and another is in the degrees.

If two or more ſounds be compared together in this relation, they are neither equal or unequal in the degree of tune.

Such as are equal are called uniſons.

The unequal conſtitute what we call an interval, which is the difference of time between two ſounds.

Sonorous bodies we find differ in tune: 1. According to the different kinds of matter; thus a wedge of ſilver ſounds much more acute than a wedge of gold of the ſame ſhape and dimenſions, in which caſe the tones are proportional to the ſpecific gravity. 2. According to the different quantities of the ſame matter in bodies of the ſame figure, a ſolid ſphere of braſs, one foot diameter, ſounds acuter than one of two feet diameter; in which caſe the tunes are proportional to the quantity of matter. Here then are different tunes connected with different ſpecific gravities and quantities of matter, as their immediate cauſe. In effect, the meaſures of tune are only ſought in the relations of the motions that are the cauſe of ſound, which are no way ſo diſcernable as in vibrations of chords. See the article CHORD.

In the general we find that, in two chords, all things being equal, except tenſion, or thickneſs, or length, the tunes are different; there muſt, therefore, be a difference in the vibrations owing to theſe different tenſions, *&c.* which difference can only be in the velocity of the courſes and recourſes of the chords, through the ſpaces wherein they move to and again. Now, upon examining the proportion of the velocity and the things juſt mentioned, wherein it depends, it is found, to a demonſtration, that all the vibrations of the ſame chord are performed in equal times. Hence, as the tone of a ſound depends on the nature of thoſe vibrations, whoſe difference we can conceive no otherwiſe than as having different velocities; and as the ſmall vibrations of the ſame chord are performed in equal times, and it is found true, in fact, that the ſound of any body, ariſing from any individual ſtroke, tho' it grow gradually weaker, yet continues the ſame tone from firſt to laſt: it follows, that the tone is neceſſarily connected with a certain quantity of time, in making every ſingle vibration; or, that a certain number of vibrations, accompliſhed in a given time, conſtitutes a certain determinate tune; for the more frequent thoſe vibrations are, the more acute the tone; and, the ſlower and fewer they are, the more grave the ſound, though performed in the ſame ſpace of time; ſo that any given note of a tune is made by one certain meaſure of velocity of vibrations, *i. e.* ſuch certain courſes and recourſes of a chord or ſtring, in ſuch a certain ſpace of time, conſtitute a determinate tune. See NOTE.

This theory is ſtrongly ſupported by our beſt and lateſt writers on muſic, Dr. Holder, Mr. Malcolm, *&c.* both from reaſon and experience. Dr. Wallis, who holds it very reaſonable, adds that it is evident the degrees of acuteneſs are reciprocally as the lengths of the chords, though, he ſays, he will not poſitively affirm that the degrees of acuteneſs anſwer the number of vibrations as their true cauſe: but this difference ariſes hence, that he doubts whether the thing has been ſufficiently proved by experiment. Indeed, whether the different number of vibrations, in a given time, is the true cauſe on the part of the object of our perceiving a difference of tune, is a thing which, we conceive, does not come within the reach of experiment. It is enough that the hypotheſis is reaſonable. See the articles CONCORD, HARMONY, *&c.*

TUNICA, a kind of waiſtcoat, or undergarment, in uſe amongſt the Romans. They wore it within doors by itſelf, and abroad under the gown. The common people could not afford the toga, and ſo went in their tunics, whence Horace calls them popellus tunicatus. The ſeveral ſorts of the tunic were the palmata, the anguſticlavia, and the laticlavia. The firſt was worn by generals in a triumph, and perhaps always under the toga picta; it had its name either from the great breadth of the clavi, equal to the palm of the hand; or elſe from the figures of palms, embroidered on it. For the other two, ſee the article CLAVUS.

It was by theſe three different ſorts of tunics, that the three different orders of the roman people were diſtinguiſhed in habit.

TUNICA,

TUNICA, *tunic*, in anatomy, is applied to the membranes which inveſt the veſſels, and divers others of the leſs ſolid parts of the body; thus the inteſtines are formed of five tunics, or coats, for which ſee the article INTESTINES.

There are alſo five tunics, or coats, of the eye, for which, ſee the article EYE.

TUNIS, the capital of the kingdom of Tunis, thirty miles ſouth of Carthage-ruins, 300 miles eaſt of Algiers, and 120 ſouth-weſt of Trapano, in Sicily; a populous city, about three miles in circumference: eaſt long. 10° north lat. 36° 20′. The kingdom of Tunis is ſituated on the coaſt of Barbary, in Africa, being bounded by the Mediteranean Sea, on the north. It extends 200 miles in length from eaſt to weſt, along the ſhore of the Mediterranean; the breadth is very unequal.

TUNNAGE is uſed for a cuſtom or impoſt, payable to the crown, for goods and merchandize imported or exported, and is to be paid after a certain rate for every tun thereof. This duty, as well as that of poundage, was firſt granted for life to king Charles II. and has been continued in the ſame manner to his royal ſucceſſors, down to his preſent majeſty king George II.

TUNNEL-NET, a net for taking partridges, which ſhould not exceed fifteen feet in length, nor be leſs than eighteen inches in breadth, or opening for the entrance. See the article NET.

When you have found a covey, fetch a compaſs and pitch the net at a good diſtance from them, ſometimes farther, at other times nearer, according to the ſituation of the ground; ſurround them either with a natural or artificial ſtalking horſe, and gently drive them towards the net, not coming on them in a direct line, but by turnings and windings, and ſometimes ſtanding ſtill, as if the horſe grazed. In caſe they make a ſtand and look up, it is a ſign of fear, and that they intend to take wing; ſtand ſtill therefore, or retreat for a while, and when you find them quiet after a little reſpite, and buſy in ſeeking after meat, you are to move nearer, and if any ſingle partridge lies remote from the reſt, he may be brought in by fetching a compaſs about him. The wing of the tunnel muſt not be pitched in a direct line, but inclining to a ſemi circle. See STALKING.

TUNNING *of ale or beer*, a part of the proceſs of brewing, or rather an operation which is the ſequel thereof. When the beer has worked or fermented in an open vat, as long as is proper, tun it up into ſeaſoned veſſels, that is, ſuch as have had ale or beer in them before; for if it be put into new caſks, it muſt be made ſtronger than ordinary, elſe it will not keep ſo long, becauſe the caſk will imbibe the ſpirits, and the reſt will ſoon become flat and vapid. It is beſt to tun beer juſt when it comes to a due fermentation, and gets a good head; for then it has the moſt ſtrength to clear itſelf in the caſk, and what works over may be put into the ſmall beer, and muſt be ſupplied with freſh beer of the ſame brewing. When the beer is tunned, carry it while it works in the caſk, into a good cellar, or proper place to preſerve it; for if it be ſtirred after it has done working, it will be apt to grow ſtale, ſour, and become alegar, unleſs it be drawn out into another caſk.

TUNNY, *thynnus*, in ichthyology, the ſcomber, with eight or nine pinnules on the hinder part of the back, and a furrow at the belly fins. See SCOMBER.

TURBAN, or TURBANT, the head-dreſs of moſt of the eaſtern nations. It conſiſts of two parts, a cap, and a ſaſh of fine linnen, or taffety, artfully wound in divers plaits about the cap. The Turks call the ſaſh turbent, whence we have formed turban. The cap has no brim, is pretty flat, though roundiſh at top, and quilted with cotton, but does not cover the ears. There is a good deal of art in giving the turban a fine air, and the making of them is a particular trade. The ſaſh of the Turks turban is white linnen; that of the Perſians red woollen. Theſe are the diſtinguiſhing marks of their different religions. Sophi, king of Perſia, being of the ſect of Ali, was the firſt who aſſumed the laſt colour, to diſtinguiſh himſelf from the Turks, who are of the ſect of Omar, and whom the Perſians eſteem heretics. The Emirs, who pretend to be deſcended of the race of Mahomet, wear their turbans quite green, which was the colour wore by that falſe prophet. The grand ſeignior's turban is as big as a buſhel, and ſo exceedingly reſpected by the Turks, that they ſcarce dare touch it. It is adorned with three plumes of feathers, enriched with diamonds and precious ſtones, and he has an officer on purpoſe to look after it. The grand vizier's turban has two plumes; to have thoſe of divers other

officers,

officers, only ſmaller one than another; others have only one, and others none at all. The turban of the officers of the divan is of a peculiar form.

TURBAN-SHELL, in conchyliology, the engliſh name of the roundiſh centronia. See the article CENTRONIA.

TURBARY, denotes a right to dig turfs on another's ground; and it is likewiſe taken for the ground or place where turfs are digged, ſometimes called the turfary.

TURBINATED, is a term applied by naturaliſts, to ſhells, which are ſpiral, or wreathed, conically, from a larger baſis to a kind of apex.

TURBITH, or TURPETH-ROOT, in the materia medica, the cortical part of the root of an indian convolvulus, brought to us in oblong pieces, of a brown or aſh-colour on the outſide, and whitiſh within: the beſt is ponderous, not wrinkled, eaſy to break, and diſcovering a large quantity of reſinous matter to the eye: its taſte is at firſt ſweetiſh; when chewed for a little time, it becomes acid, pungent, and nauſeous. This root is a cathartic, not of the ſafeſt, or moſt certain kind: the reſinous matter in which its virtue reſides, appears to be very unequally diſtributed, inſomuch that ſome pieces, taken from a ſcruple to a dram, purge violently; whilſt others, in larger doſes, have ſcarce any effect at all. An extract made from the root, is more uniform in ſtrength, though not ſuperior, or equal, to purgatives more common in the ſhops.

Turbith pays a duty on each pound imported of 11 $\frac{62\frac{1}{2}}{100}$d. and draws back, for each pound exported, 10 $\frac{2}{100}$d.

TURBITH-MINERAL, a name given by chemiſts, to a yellow precipitate of mercury, prepared after the following manner. Upon purified quickſilver, contained in a glaſs veſſel, pour double its weight of the ſtrong ſpirit or oil of vitriol. Heat the liquor by degrees, ſo as at length to make it boil, till a white maſs remains, which is to be thoroughly dried, with a ſtrong fire. This maſs, on the affuſion of warm water, grows yellowiſh, and falls into powder; which is to be carefully ground with the water in a glaſs mortar: then ſuffer it to ſettle, pour off the water, and waſh the powder in ſeveral parcels of freſh water, until it is ſufficiently dulcified.

This preparation is a ſtrong emetic, and operates the moſt powerfully of all the mercurials that can be ſafely given internally. Its action, however, is not confined to the primæ viæ; it will ſometimes excite a ptyaliſm, if a purgative is not ſoon taken after it. It is uſed chiefly in violent gonorrhæas, and other venereal caſes, where there is a great flux of humours to the parts; the doſe is from two grains, to ſix or eight, though there are ſome conſtitutions, which have been uſed to mercurials, that bear well even the doſe of a ſcruple. This medicine has alſo of late been recommended, as the moſt effectual preſervative againſt the hydrophobia. See HYDROPHOBIA.

The waſhings of turbith mineral are by ſome externally applied for the itch, and other cutaneous foulneſſes; but in theſe caſes, though it often does ſervice, the patient muſt not be too free with it.

TURBO, in natural hiſtory, a genus of univalve ſhells, with a long, wide, and depreſſed mouth, in ſome ſpecies approaching to a round ſhape, and in ſome having teeth, in others not. They all grow narrow toward the baſe, and are auriculated, and terminate in a very long and ſharp point.

Of this genus, there are a great many elegant ſpecies; as the ſlender turbo, with ventricoſe ſpires, and a ſmall round mouth, about five or ſix inches long. (ſee plate CCLXXXIX. fig. 3. n° 1.) The rough ſcrew-ſhell is repreſented, (*ibid.* n° 2.) beſides which, there are numerous other ſpecies, as the caterpillar-ſhell, teleſcope-ſhell, *&c.* all diſtinguiſhed by their different ſpires, and the form of their mouths.

TURBOT, or TURBUT, in ichthyology, the engliſh name of a ſpecies of pleuronectes, with the eyes on the right ſide, and the body ſmooth. See the article PLEURONECTES.

It grows to a conſiderable ſize, and is one of the moſt eſteemed fiſh at table.

TURCOISE, or TURQUOISE, *turcheſia*, in natural hiſtory, an ore of copper, erroneouſly ranked among gems. See the article COPPER.

There are, indeed, two kinds of turcois; the one a true and genuine ore of copper; the other the bones of animals tinged to a beautiful blue colour, by having been buried in places where copper-ore has been near them.

That kind which we uſually diſtinguiſh

by the name of the turquoiſe of the old rock, and which Pliny and the antients called callais, is a true and genuine copper-ore, and is of exactly that kind in regard to this metal, that the hæmatites is to iron; it is found in the perpendicular fiſſures of the ſtrata of ſtone, which contain copper adhering to their ſides in form of a cruſt, and riſing into botryoide efflorescences, which ſometimes ſtand ſingle, and are in bigneſs from the ſize of a pea to that of a walnut; but ſometimes happening to be placed cloſe to one another, they join and form flat cruſts or maſſes, extending, in the manner of cruſts of the hæmatites, to three, four, or more inches in breadth; in theſe the prominent part of every tubercle appearing on the ſurface, the whole ſeems a conjunction of ſemi-circular bodies of a fine blue colour joined by an intermediate ſubſtance of the ſame nature.

This kind of the turquoiſe is of a very cloſe texture and gloſſy ſurface, but very ſoft, and, when broken, ſhews the ſame cruſtated and ſtriated texture with the hæmatites; only that the ſtriæ are uſually finer, and the plates better joined. It ferments with aqua fortis, and may be in great part diſſolved by it; and on calcining, it loſes all its colour, and becomes of a dirty white. This is produced in Perſia, and ſome other parts of the eaſt. The Germans alſo have a botryoide copper-ore, in ſome of their mines; but it is green and much ſofter than the true turquoiſe of this kind, though this has been often produced among us alſo under the name of that gem.

The other turquoiſe is nothing more than the teeth or bones of animals, which have lain in the way of effluvia, in which copper has been contained, and by this means have acquired veins and ſtreaks of a deep blue, which, on the whole being ſlightly calcined, diffuſe themſelves through all the ſubſtance, and give it the fine pale blue we ſo much admire in this gem. If the fire that diffuſes this colour be a little too ſtrong, it ſends it wholly off, and leaves in place of the turquoiſe only a white bone. The turquoiſes of this laſt kind are common in France; there are mines of them there, and the people who work them are perfectly acquainted with the method of diffuſing the colour through them. Theſe are what are now uſually worn, and, when fine, are called, by many of our jewellers, turquoiſes of the old rock, as well as the other. The virtues attributed to this gem are very great, but all we know of it at preſent is, that, like the other bodies that contain copper, it is a violent emetic, and not fit to be received into practice.

TURCOMANIA, a province of aſiatic Turkey, bounded by Perſia on the eaſt, and anſwers to the antient Armenia; its capital is Erzerum. See ERZERUM.

TURDUS, in ornithology, a genus of birds, of the order of the paſſeres, the beak of which is of a conic form, and ſtraight, only ſomewhat bent on the upper part, and has no membrane at the baſe: the tongue is lacerated and emarginated.

Under this genus are comprehended the black-bird, thruſh, red-wing, &c. See the article BLACK-BIRD, &c.

TURDUS, in ichthyology, the name by which authors call the green labrus, with a blue line on each ſide; a very beautiful fiſh, from eight to fourteen inches in length, and conſiderably thick in proportion. See LABRUS.

TURENNE, a town of Guienne, in France: eaſt long. 1° 20′, and north lat. 45° 7′.

TURF, a blackiſh ſulphureous earth, uſed in ſeveral parts of the kingdom as fuel. See FUEL and TURBARY.

TURGESCENCE, or TURGESCENCY, among phyſicians, denotes a ſwelling, or growing bloated.

TURIN, the capital of Piedmont, in Italy, and of the king of Sardinia's dominions, is ſituated at the confluence of the rivers Po and Doria, 100 miles ſouth-weſt of Milan: eaſt long. 7° 16′, and north lat. 44° 50′.

TURIONES, among herbaliſts, denotes the firſt young tender ſhoots, which plants annually put forth.

TURKEY, *meleagris*, in ornithology, a genus of birds, the anterior part of the head of which is covered with a fleſhy pendulous ſubſtance, the ſides of the head alſo, and the throat, are covered with a papillous fleſhy matter, and there is a longitudinal fleſhy creſt, of a reddiſh, bluiſh, or purpliſh colour, and a ſoft ſubſtance. This is a large, but unweildy bird, the head is ſtrangely covered and ornamented with a pendulous, ſoft, fleſhy, ſubſtance, as already obſerved; the eyes are ſmall, but bright and piercing, the wings are moderately long, though not at all formed for ſupporting ſo large a bulk in long flights, they have each twenty-

twenty-eight long feathers; the tail is long and large, the legs moderately long and very robuſt.

There is but one known ſpecies of this genus.

TURKY, a very extenſive empire, comprehending ſome of the richeſt countries in Europe, Aſia, and Africa.

Turky in Europe, comprehends Romania, Bulgaria, Servia, Boſnia, Raguſa, Wallachia, Moldavia, Beſſarabia, Budziac, Crim, and Little Tartary, with Albania, Epirus, Macedonia, Theſſaly, and all the antient Greece, with its numerous iſlands. See ROMANIA, *&c.*

Turky in Aſia, comprehends Natolia, Diarbeck, Syria, Turcomania, and part of Georgia and Arabia. See the article NATOLIA, *&c.*

And Turky in Africa, comprehends the fruitful and extenſive country of Egypt. See the article EGYPT.

TURMERIC, in the materia medica, the root of a plant, called by botaniſts curcuma. See the article CURCUMA.

It is a ſmall root, of an oblong figure, uſually met with in pieces from half an inch to an inch or two in length, and at the utmoſt ſurface the thickneſs of a man's little finger; its ſurface is uneven, and riſes into knobs in many places, and the longer pieces are ſeldom very ſtraight; it is very heavy and hard to break; it is not eaſily cut through with a knife, but, when cut, leaves a gloſſy ſurface. Its colour externally, is a pale whitiſh grey, with ſome faint tinge of yellowneſs, and when broken, is of a fine yellow within; this colour is bright and pale, and without admixture, when the root is freſh; but in keeping it by degrees becomes reddiſh, and at length is much like ſaffron in the cake. Thrown into water, it ſpeedily gives it a fine yellow tinge, and, chewed in the mouth, it gives the ſpittle the ſame colour. It is eaſily powdered in the mortar, and, according to its different age, makes a yellow, an orange colour, or a reddiſh powder. It has a kind of aromatic ſmell, with ſomething of the odour of ginger in it. The taſte is acrid and diſagreeable, and has a conſiderable bitterneſs.

It is brought from the Eaſt-Indies, where they uſe it in ſauces and foods. As a medicine, it is eſteemed aperient and emmenagogue, and of ſingular efficacy in the jaundice.

But beſides theſe uſes, the glovers uſe it for dying their leather, and the turners to give an agreeable yellow to ſeveral of their works, made in the whiter woods.

TURN, in law, a court held twice a year, *viz.* within a month after Eaſter and Michaelmas, reſpectively, by the ſheriff of every county.

By magna charta, ſheriffs were reſtrained from holding pleas of the crown; but they are ſtill judges of record, and may take indictments and preſentments, and inquire of all treaſons and felonies by the common law, as well as the loweſt offences againſt the king; common nuſances, annoyances, purpreſtures, *&c.* Alſo of perſons ſelling corrupt victuals, breaking the aſſiſe of ale and beer, or keeping falſe weights, *&c.* diſturbers of the peace and barretors, *&c.* and may amerce for offences, *&c.*

TURNADO, or TORNADO, a wind which on ſome coaſts blows all night from the ſhore.

TURNAMENT, or TOURNAMENT, a martial ſport, or exerciſe, which the antient cavaliers uſed to perform to ſhew their bravery and addreſs.

TURNEP, *rapa*, in botany, a ſpecies of Braſſica. See the article BRASSICA.

TURNERA, in botany, a genus of the *pentandria-tryginia* claſs of plants, the flower of which conſiſts of five petals obverſely cordated, and ſharp-pointed: the fruit is an oval, unilocular capſule, containing a great many oblong and obtuſe ſeeds.

TURNHOUT, a town of Brabant, twenty-four miles north-eaſt of Antwerp.

TURNING, a branch of ſculpture, being the art of faſhioning hard bodies, as braſs, ivory, wood, *&c.* into a round or oval form, in a lathe.

Turning is performed by putting the ſubſtance to be turned upon two points as an axis, and moving it round on that axis; while an edge-tool, ſet ſteady to the outſide of the ſubſtance in a circumvolution thereof, cuts off all the parts which lie farther off the axis, and makes the outſide of that ſubſtance concentric to the axis. See LATHE.

The invention of turning ſeems to have been very antient. Some, indeed, to do honour to the age, will have it brought to perfection by the moderns; but, if what Pliny and ſome other antient authors relate, be true, that the antients turned thoſe precious vaſes enriched with figures and ornaments in relievo, which we ſtill ſee in the cabinets of the curious, it muſt be owned that all that has been

added in theſe ages, makes but a poor amends for what we loſt of the manner of turning of the antients.

TURNPIKE, a gate ſet up a-croſs a road, watched by an officer for the purpoſe, in order to ſtop travellers, waggons, coaches, *&c.* to take toll of them towards repairing or keeping the roads in repair.

Juſtices of the peace, and other commiſſioners, are authorized to appoint ſurveyors of the roads, and collectors of toll, which is uſually 1s. or 6d. for a coach or waggon, and 1d. for a horſe, *&c.* In caſe any perſons ſhall drive horſes or other cattle through grounds adjoining to the highways, thereby to avoid the toll, they are liable to forfeit 10s. Likewiſe if any one aſſaults a collector of the tolls, or by force paſſes through a turnpike-gate without paying, he forfeits 5 l. leviable by juſtices of peace; and maliciouſly pulling down a turnpike is deemed felony, *&c.* It is alſo enacted; that 20s. ſhall be paid for every hundred that a carriage with its loading weighs above 6000 pound weight, and that engines may be ſet up at turnpikes for weighing ſuch carriages.

TURNPIKE, is alſo uſed in the military art for a beam ſtruck full of ſpikes, to be placed in a gap, a breach, or at the entrance of a camp, to keep off an enemy. See CHEVAUX *de friſe*.

TURNSOLE, or TORNSOLE, in botany, the engliſh name for the croton of Linnæus, and the heliotropium-tricoccum of other authors. See CROTON.

TURPENTINE, a tranſparent ſort of reſin, flowing either naturally or by inciſion from ſeveral unctuous and reſinous trees, as the terebinthus, larch, pine, fir, *&c.*

We diſtinguiſh ſeveral kinds of turpentines; as that of Chio, that of Venice, that of Bourdeaux, that of Cyprus, Straſburg, *&c.*

The turpentine of Chio or Scio, which is the only genuine kind, and that which gives the denomination to all the reſt, is a whitiſh reſin, bordering a little on green, very clear, and a little odoriferous; drawn by inciſion from a tree called terebinthus, very common in that iſland, as alſo in Cyprus, and ſome parts of France and Spain.

The reſin muſt be choſen of a ſolid conſiſtence almoſt without either taſte or ſmell, and not at all tenacious, which diſtinguiſhes it from the falſe turpentine of Venice, commonly ſubſtituted for it, which has a briſker ſmell, a bitter taſte, and ſticks much to the finger. This turpentine of Chio is indiſputably the beſt, but its ſcarcity occaſions it to be little in uſe. The turpentine of Venice is falſely ſo called; for, though there was a turpentine antiently brought from Venice, yet, that now ſo called comes from Dauphine. It is liquid, of the conſiſtence of a thick ſyrup, and whitiſh; and flows either ſpontaneouſly or by inciſion, from the larix or larch-tree chiefly in the wood de Pilatze.

That flowing naturally, called by the peaſants bijon, is a kind of balſam, not inferior in virtue to that of Peru, for which it is frequently ſubſtituted. That drawn by inciſion, after the tree has ceaſed to yield ſpontaneouſly, is of conſiderable uſe in ſeveral arts, and it is even of this that varniſh is chiefly made. It muſt be choſen white and tranſparent, and care be taken that it be not counterfeited with oil of turpentine. The turpentine of Bourdeaux is white, and as thick as honey. It does not ooze from the tree in the manner it is ſent to us, but is properly a compoſition wherein among other ingredients is a white hard ſort of reſin called galipot. See PITCH.

The turpentine of Straſburg, the produce of the abies or ſilver fir, is that moſt commonly uſed among us, and is preferred by our people to that of Venice, which is diſtinguiſhed from it by its green hue, fragrant ſmell, and citron-flavour.

The uſes of turpentine in medicine are innumerable. It is a great vulnerary, and very detergent, and as ſuch is preſcribed in abſceſſes, ulcerations, *&c.* It promotes expectoration, and as ſuch is preſcribed in diſeaſes of the lungs and breaſt; but it is moſt famous for clearing the urinary paſſages, and as ſuch preſcribed in obſtructions of the reins, in gonorrhœas, *&c.*

Oil of TURPENTINE. There are two kinds of oil drawn from turpentine, by diſtillation; the firſt white, the ſecond red, both eſteemed as balſams proper for the cure of wounds, chilblains, *&c.* But they are ſo little uſed among us, that it is not eaſy to procure either of them.

What is commonly ſold under the name of oil of turpentine, or etherial oil, is only a diſtillation of the reſinous juice of the tree, freſh as it is gathered. It is uſed with ſucceſs in the cure of green wounds, as alſo by the painters, farriers, *&c.* To be good, it muſt be clear and pellucid

Fig. 1. The TUSCAN Order

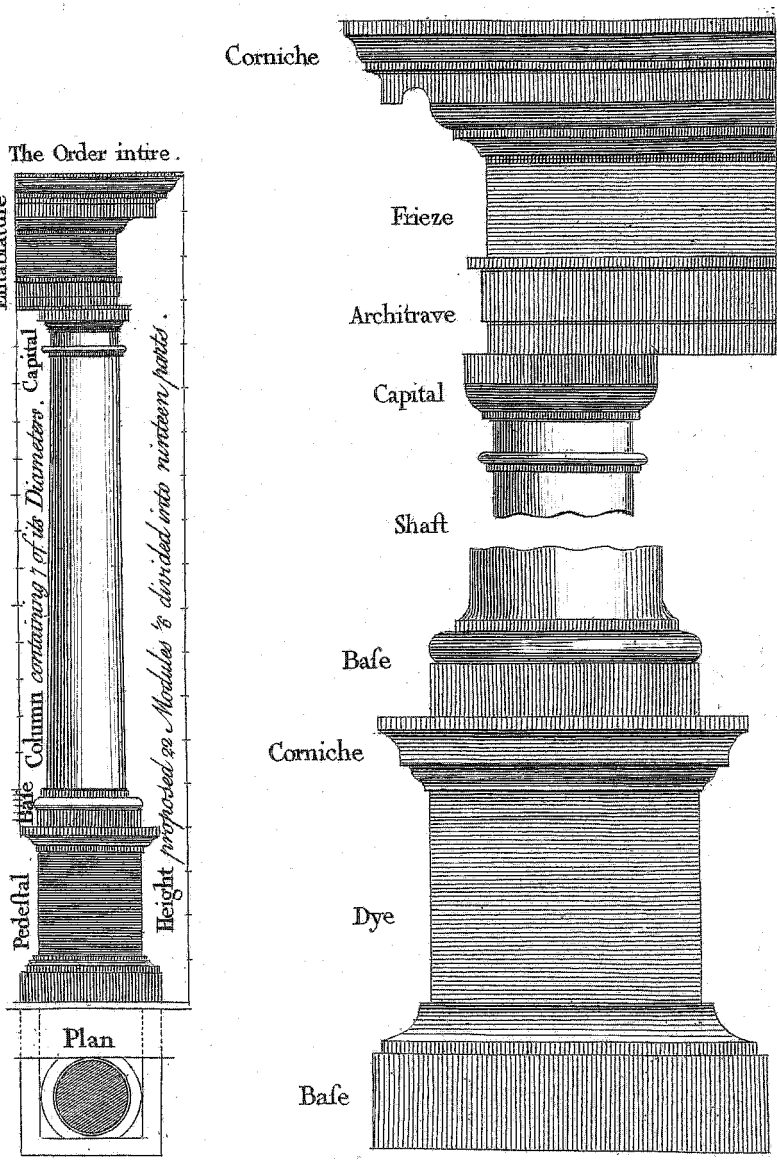


Fig. 2. TRESSURE

Fig. 3. VAIR.

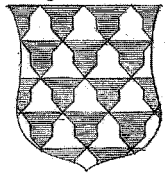
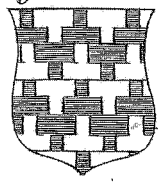


Fig. 4. VAIRY CUPPY.



T. Jefferys sculp

pellucid as water, of a ſtrong penetrating ſmell, and very inflammable.

TURPENTINE-TREE, *terebinthus*, in botany, a ſpecies of piſtachia. See the article PISTACHIA.

TURQUOISE, or TURCOISE. See the article TURCOISE.

TURRITIS, TOWER-MUSTARD, in botany, a genus of the *tetradynamia ſiliquoſa* claſs of plants, with a tetrapetalous cruciform flower: its fruit is an extremely long pod, containing numerous ſeeds.

TURSIS, a town of the kingdom of Naples, in Italy, ſituated ten miles north-weſt of the gulph of Taranto: eaſt long. 17° 6′, north lat. 40° 15′.

TURUNDA, in medicine and ſurgery, denotes a tent, pellet, or pencil; or a piece of lint thruſt into a wound, ulcer, &c. See the article TENT.

TURTLE, in ichthyology, a name given to ſome ſpecies of the teſtudo, as the hawk's bill turtle is the teſtudo with acuminated ungues, four on the hinder as well as the fore feet; the green turtle, or the teſtudo, with two ungues on the fore feet, and one on the hinder; and the long headed turtle, or the great oval headed teſtudo. See TESTUDO.

TURTLE-DOVE, is a ſpecies of the columba kept tame. See COLUMBA.

TUSCAN ORDER, in architecture, the firſt, ſimpleſt, and moſt maſſive of the five orders. See pl. CCLXXXVIII. fig. 1. The tuſcan is called the ruſtic order by Vitruvius, and M. de Cambray agrees with him, who in his parallel, ſays, it never ought to be uſed but in country-houſes and palaces. M. Le Clerc adds, that in the manner Vitruvius, Palladio, and ſome others, have ordered it, it does not deſerve to be uſed at all. But in Vignola's manner of compoſition, he allows it a beauty, even in its ſimplicity, and ſuch as makes it proper, not only for private houſes, but even for public buildings, as in the piazzas of ſquares and markets, in the magazines and granaries of cities, and even in the offices and lower apartments of palaces.

The tuſcan has its character and proportions as well as the other orders; but we have no antient monuments to give us any regular tuſcan pillar for a ſtandard. M. Perrault obſerves, that the characters of the tuſcan are nearly the ſame with thoſe of the doric, and adds, that the tuſcan is in effect no more than the doric made ſomewhat ſtronger, by ſhortening the ſhaft of the column; and ſimpler, by the ſmall number, and largeneſs of the mouldings. See DORIC.

Vitruvius makes the whole height of the order fourteen modules, in which he is followed by Vignola, M. Le Clerc, &c. Serlio makes it but twelve. Palladio gives us but one Tuſcan profile much the ſame as that of Vitruvius, and another too rich, on which ſide Scamozzi is likewiſe too faulty. Hence it is, that that of Vignola, who has made the order very regular, is moſt followed by the modern architects.

Of all the orders, the tuſcan is the moſt eaſily executed, as having neither triglyphs nor dentils, nor modillions, to cramp its intercolumns. On this account, the columns of this order may be ranged in any of the five manners of Vitruvius, *viz.* the pycnoſtyle, ſyſtyle, euſtyle, diaſtyle, and araeoſtyle. See the articles PYCNOSTYLE, SYSTYLE, &c.

TUSCAN *order by proportions of equal parts.* The height of the pedeſtal, being two diameters, is divided into 4, giving 1 to the baſe, whoſe plinth is $\frac{2}{3}$ thereof, the other part is divided into three, giving one to the fillet, and two to the hollow. The breadth of the die or naked is one diameter, and $\frac{1}{3}$, and the projection of the baſe is equal to its height, the fillet hath three-fourths thereof. The height of the corniche is half the baſe, being $\frac{1}{8}$ of the whole height, and is divided into 8, giving 2 to the hollow, 1 to the fillet, and 5 to the band; the projection is equal to the baſe, and the fillet hath three of theſe parts. Baſe of the column: the height is one half a diameter, and is divided into ſix parts, giving three to the plinth, 2 and $\frac{1}{2}$ to the torus, and $\frac{1}{2}$ a part to the fillet; the whole projection is $\frac{1}{3}$ of its height. The hollow, or cincture, is one fourth of a circle, in all the orders, and belongs to the ſhaft of the column.

The diminiſhing of this column is $\frac{1}{6}$ of the diameter, and is divided into 9, giving 2 $\frac{1}{2}$ to the frieze of the capital, $\frac{1}{2}$ a part to the fillet, 3 to the ovolo, and 3 to the abacus. The whole projection is $\frac{1}{8}$ of the diameter, being perpendicular to the body of the column below, and the fillet projects equal to its height. The collerino, or necking of all the orders in general, is one of thoſe nine parts in the capital, and the fillet half a part, the projection is 1 and $\frac{1}{4}$ of theſe parts, and the fillet equal to its height. The height of the entablature being one diameter

and

and $\frac{3}{4}$, is divided into 6, giving 2 to the architrave, 1 $\frac{1}{2}$ to the frieze, and 2 $\frac{1}{2}$ to the corniche.

For the members of the architrave, divide the height into ſeven parts, giving 2 $\frac{1}{2}$ to the firſt face, 3 $\frac{1}{2}$ to the ſecond, and 1 to the band at top. The projection is equal to the band, and the ſecond face a third thereof. The firſt face of all the architraves is perpendicular to the naked of the column at the top. For the corniche, divide the height into 9, giving 1 $\frac{1}{2}$ to the hollow, $\frac{1}{2}$ to the fillet, 1 $\frac{1}{2}$ to the ovolo, 2 to the corona, $\frac{1}{2}$ a part to the fillet, 2 to the ſcima recta, and 1 to the fillet. For the projections, the hollow hath 2 of theſe parts, the ovolo 3 $\frac{1}{2}$, the corona 6, the fillet 6 $\frac{1}{2}$, and the whole 9 being equal to the height. See the figure.

TUSCANY, a dutchy of Italy, encompaſſed by the pope's territories on the north-eaſt and ſouth, and bounded by the Tuſcan Sea on the ſouth-weſt, and by the territories of Lucca and Modena on the north-weſt, being 100 miles long, and almoſt as many broad.

TUSCULAN, in matters of literature, a term which frequently occurs in the phraſe *tuſculan queſtions*. Cicero's tuſculan queſtions are diſputations on ſeveral topics in moral philoſophy, which that great author took occaſion to denominate from Tuſculanum, the name of a country-ſeat or villa, where they were compoſed, and where he lays the ſcene of the diſpute. They are compriſed in five books, the firſt on the contempt of death; the ſecond of enduring pain; the third on aſſwaging grief; the fourth on the other perturbations of the mind; and the laſt, to ſhew that virtue is ſufficient to a happy life.

TUSSILAGO, in botany a genus of the *ſyngeneſia-polygamia ſuperflua* claſs of plants, the compound flower of which is various. In ſome there are only tubuloſe hermaphrodite corollulæ: there are no female ones. In others, there are tubuloſe hermaphrodite ones on the diſk; the female ones are ligulated on the verge. In others, there are tubuloſe hermaphrodite flowers on the diſk; the female ones being naked, and mixed with the petal, which is infundibuliform: the limb is quinquifid or quadrifid, acute, bent backwards, and longer than the cup. There is no pericarpium except the cup: the ſeed following the hermaphrodite flower is ſingle, oblong, compreſſed, and by a ſmall thread ſuſtains a hairy pap. If there are any ſeeds following the female flower, they are like the hermaphrodite ones.

This genus comprehends the tuſſilago, or common colt's-foot, the cacalia, and the petaſites, or butter-bur.

The common tuſſilago, or colt's-foot, ſtands recommended in coughs, and other diſorders of the breaſt and lungs; practice, however, ſeems to have almoſt rejected it. The petaſites, or butter-bur, has been given in the doſe of a dram, or more, as an aromatic, and likewiſe as an aperient and deobſtruent; theſe virtues, however, it poſſeſſes in ſo ſmall a degree, as to have loſt its reputation in the ſhops.

TUSSIS, the cough. See COUGH.

TUT, in armory, *&c.* an imperial enſign of a golden globe, with a croſs on it.

TUTBURY, a market-town of Staffordſhire, ſituated eighteen miles eaſt of Stafford.

TUTELARY, *tutelaris*, one who has taken ſomething into his patronage and protection.

TUTOR, in the civil law, is one choſen to look to the perſon and eſtate of children left by their fathers and mothers in their minority. A perſon nominated tutor either by teſtament, or by the relations of the minor, is to decline that office if he have five children alive, if he have any other conſiderable tutorage, if he be under twenty-five years of age, if he be a prieſt, or a regent in an univerſity, or if he have any law-ſuit with the minors, *&c.* The marriage of a pupil, without the conſent of his tutor, is invalid. Tutors may do any thing for their pupils, but nothing againſt them, and the ſame laws which put them under a neceſſity of preſerving the intereſt of the minors, put them under an incapacity of hurting them. See TUTORAGE.

TUTOR, is alſo uſed in our univerſities for a member of ſome college or hall, who takes on him the inſtruction of ſome young ſtudents in the arts or faculties.

TUTORAGE, *tutela*, in the civil law, a term equivalent to guardianſhip in the common law, ſignifying an office impoſed on any one to take care of the effects of one or more minors. See GUARDIANSHIP and TUTOR.

By the roman law, there are three kinds of tutorage; teſtamentary, which is appointed by the father's teſtament; legal, which is given by the law to the neareſt relation; and dative, which is appointed by the magiſtrate. But in all cuſtomary provinces, as France, *&c.* all tutorages are

are dative and elective, and though the father have by teſtament nominated the next relation to his pupil, yet is not that nomination of any force, unleſs the choice be confirmed by that of the magiſtrate, *&c.* By the roman law, tutorage expires at fourteen years of age. See the article CURATOR.

TUTTY, *tutia*, a recrement of mixed metals, in which lapis calaminaris, or zink in its metallic form, is an ingredient, collected in the furnaces where braſs is made from copper and calamine, and where the mixed metals are run. In theſe furnaces they place, under the roof and about the upper parts of the ſides, rods of iron, and ſometimes rolls of dry earth, about which the tutty is afterwards found. Therefore the tutty which we uſe in the ſhops at this time, owes its origin truly and properly to zink, which ſublimes with a very ſmall fire into a kind of flowers, and when fuſed with any other metal, flies from it in abundance under this form, and alſo frequently takes ſome part of that metal, more or leſs, up with it. Hence it is evident, that the tutty or cadmia of the antients, muſt have been wholly different from ours, as they uſed no zink nor any of its ores in the furnace where they collected it See ZINK and CADMIA.

Our tutty then is a hard and heavy ſemimetallic recrement, ſometimes met with in the ſhops in thin flat pieces or flakes, but moſt abundantly in tubular cylindric pieces, reſembling ſegments of the barks of trees puſhed off from the branches without breaking; theſe are of different lengths and diameters. The fineſt tutty is that of a fine deep brown on the outſide, and of a yellowiſh tinge within; the thickeſt, brighteſt, and moſt granulated; the hardeſt to break, and that which has leaſt foulneſs among it.

Tutty is celebrated as an ophthalmic, and frequently employed as ſuch in unguents and collyria. See COLLYRIA.

It is to be prepared for uſe by heating it ſeveral times red hot, and quenching it ſuddenly in roſe or common water; then powdering it in a mortar, and finally levigating it with a little water upon a ſmooth hard marble, till there does not remain the leaſt gritty particle among it. It is then to be dropped upon a chalkſtone, and left to dry.

TUXFORD, a market-town of Nottinghamſhire, twenty miles north-eaſt of Nottingham.

TUY, a town of Spain, in the province of Galicia, ſituated on the river Minho, on the confines of Portugal, twelve miles eaſt of Vigo.

TWA-NIGHTS GESTE, among our anceſtors, was a gueſt that ſtayed at an inn a ſecond night, for whom the hoſt was not anſwerable for any injury done by him, as he was in caſe of a third night-awn hynde.

TWEED, a river of Scotland, which riſes on the confines of the ſhire of Clydeſdale, and running eaſtward through Tweedale, and dividing the ſhire of Mers from Tiviotdale and Northumberland, falls into the German ſea at Berwick.

TWEEDALE, a county of Scotland, bounded by Lothian on the north, by Mers and Tiviotdale on the eaſt, by Annandale on the ſouth, and Clydeſdale on the weſt.

TWEER, a city of Ruſſia, capital of the province of Tweer, ſituated on the river Wolga, ninety miles north of Moſcow, in eaſt long. 30° 37′, north lat. 57° 25′.

TWELF-HINDI, among the engliſh Saxons, was where every perſon was valued at a certain price; and if any injury was done either to a perſon or his goods, a pecuniary mulct was impoſed, and paid in ſatisfaction of that injury, according to the worth and quality of that perſon to whom it was done, in which caſe ſuch as were worth 1200 ſhillings, were called twelf-hindi; and if an injury was done to ſuch perſons, ſatisfaction was to be made accordingly.

TWELFTH-DAY, or TWELFTH-TIDE, the feſtival of the epiphany, or the manifeſtation of Chriſt to the Gentiles; ſo called, as being the twelfth day, excluſive, from the nativity or Chriſtmas-day.

TWELVE MEN, otherwiſe called jury or inqueſt, is a number of twelve perſons, or upwards, as far as twenty-four, by whoſe oath, as to matters of fact, all trials paſs, both in civil and criminal caſes, through all courts of the common law in this realm. See JURY and TRIAL.

TWI-HINDI, among our Saxon anceſtors, were perſons valued at 200 s. theſe men were of the loweſt degree, and if ſuch were killed, the mulct was 30 s. See the article TWELFHINDI.

TWILIGHT, *crepuſculum*, that light, whether in the morning before ſun-riſe, or in the evening after ſun-ſet, ſuppoſed to begin and end when the leaſt ſtars that can be ſeen by the naked eye ceaſe, or begin, to appear, repreſented

in

in plate CCLXXXIX. fig. 1. by that obſcure part comprehended between H O A B, which is neither dark nor light. This is the twilight, the line A B being 18° below the horizon H O; and during the time the ſun paſſeth from H O to A B, in the parallel of any day, his rays are partly refracted by the atmoſphere, and ſo we have ſome faint light till he gets below the limit A B, when we are left in total darkneſs. Or it is twilight, while the ſun is paſſing from X to R, from Y to S, and from Z to M, on the days the ſun deſcribes the parallels T R, Æ Q and V W. By means of the atmoſphere it happens, that though none of the ſun's direct rays can come to us after it is ſet; yet we ſtill enjoy its reflected light for ſome time, and night approaches by degrees. For after the ſun is hid from our eyes, the upper part of our atmoſphere remains for ſome time expoſed to its rays, and from thence the whole is illuminated by reflection. But as the ſun grows lower and lower, that portion of the atmoſphere which is above our horizon, becomes enlightened till the ſun has got eighteen degrees below it; after which it ceaſes to be illuminated thereby, till it has got within as many degrees of the eaſtern ſide of the horizon; at which time it begins to illuminate the atmoſphere again, and in appearance to diffuſe its light throughout the heavens, which continues to increaſe till the ſun be up. See the articles AIR, ATMOSPHERE, REFLECTION, and REFRACTION.

Hence it is, that during that part of the year in which the ſun is never eighteen degrees below our horizon, there is a continued twilight from ſun-ſetting to ſun-riſing. Now that part of the year in the latitude of London, is while the ſun is paſſing from about the fifth degree of gemini to the twelfth of cancer; that is, from about the 26th of May to the 18th of July: for when the ſun deſcribes the parallel T R, that is, the tropic of cancer, there is no dark night at all; for the parallel of that day, T R, doth not touch A B, nor will it for about a month before and after. On the other hand, the ſhorteſt twilight in the year happens about the 14th of October and 4th of March, for then the ſun deſcribes the parallel whoſe diſtance *e o* is the leaſt between H O and A B of any other whatſoever.

As the twilight depends on the quantity of matter in the atmoſphere fit to reflect the ſun's rays, and alſo on the height of it (for the higher the atmoſphere is, the longer will it be, before the upper parts of it will ceaſe to be illuminated) the duration of it will be various. For inſtance, in winter, when the air is condenſed with cold, and the atmoſphere upon that account lower, the twilight will be ſhorter; and in ſummer, when the limits of the atmoſphere are extended by the rarefaction and dilatation of the air, of which it conſiſts, the duration of the twilight will be greater. And for the like reaſon, the morning twilight, the air being at that time condenſed and contracted by the cold of the preceding night, will be ſhorter than the evening one, when the air is more dilated and expanded.

TWINS, two young ones delivered at a birth, by an animal which ordinarily brings forth but one.

TWINS, in aſtronomy, the ſame with gemini. See the article GEMINI.

TWIST *of a rope, cord,* &c. See the article ROPE, *&c.*

TWIST is alſo uſed for the inſide or flat part of a man's thigh, upon which a true horſeman reſts when on horſeback.

To TWIST *an horſe*, is violently to wring or twiſt his teſticles twice about, which cauſes them to dry up, and deprives them of nouriſhment, and reduces the horſe to the ſame ſtate of impotency with a gelding.

TWISTED COLUMN. See COLUMN.

TYCHONIC SYSTEM, or HYPOTHESIS, an order or arrangement of the heavenly bodies, of an intermediate nature between the copernican and ptolemaic, or participating alike of them both. See COPERNICAN and PTOLEMAIC.

This ſyſtem had its name and original from Tycho Brahe, a nobleman of Denmark, who lived in the latter part of the laſt century. This philoſopher, though he approved of the copernican ſyſtem, yet could not reconcile himſelf to the motion of the earth; and being on the other hand convinced the ptolemaic ſcheme could not be true, he contrived one different from either, as repreſented plate CCLXXXIX. fig. 2. In this the earth has no motion allowed it, but the annual and diurnal phænomena are ſolved by the motion of the ſun about the earth, as in the ptolemaic ſcheme; and thoſe of mercury and venus are ſolved by this contrivance, though not in the ſame manner, nor ſo ſimply and naturally as in the copernican ſyſtem. The tychonic

Fig. 1. TWILIGHT.

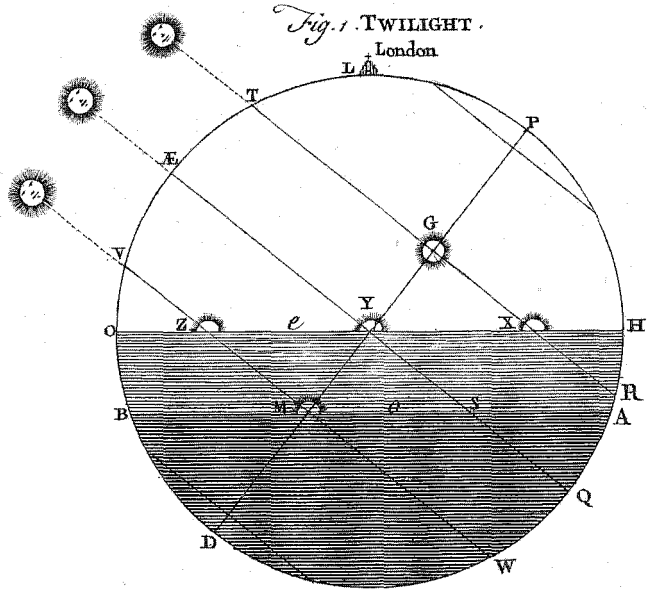


Fig. 2. The TYCHONIC SYSTEM.

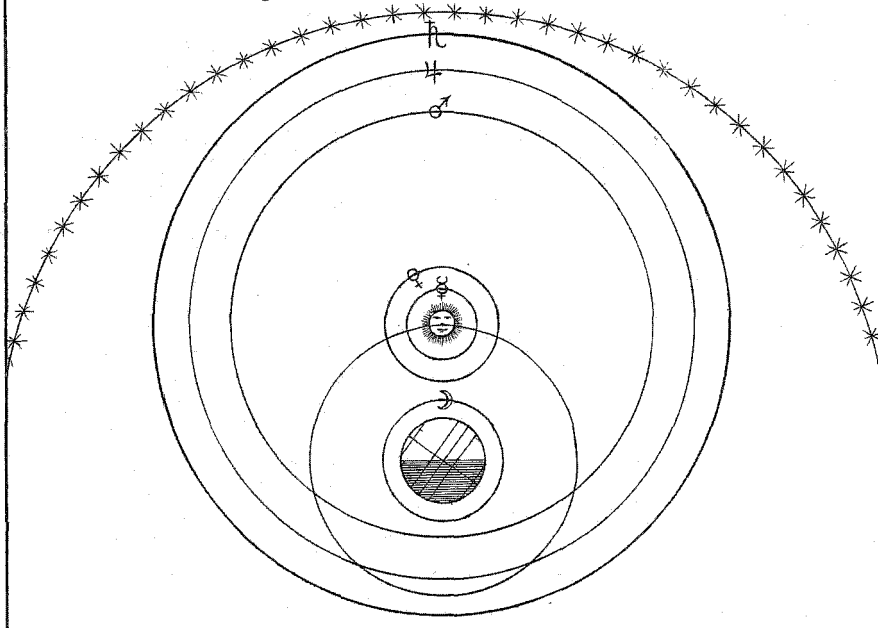
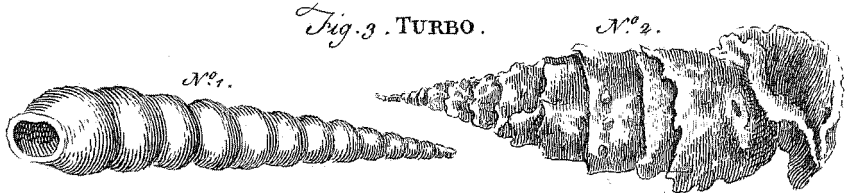


Fig. 3. TURBO.



T. Jefferys sculp.

ſyſtem then ſuppoſed the earth in the center of the world, that is, of the firmament of ſtars, and alſo of the orbits of the ſun and moon; but at the ſame time it made the ſun the center of the planetary motions, *viz.* of the orbits of mercury, venus, mars, jupiter and ſaturn. Thus the ſun, with all its planets, was made to revolve about the earth once a year, to ſolve the phænomena ariſing from the annual motion, and every twenty-four hours, to account for thoſe of the diurnal motion. But this hypotheſis is ſo monſtrouſly abſurd, and contrary to the great ſimplicity of nature, and, in ſome reſpects, even contradictory to appearances, that it obtained but little credit, and ſoon gave way to the copernican ſyſtem.

After this ſcheme had been propoſed for ſome time, it received a correction by allowing the earth a motion about its axis to account for the diurnal phænomena of the heavens; and ſo this came to be called the ſemi-tychonic ſyſtem. But this was ſtill void of the truth, and encumbered with ſuch hypotheſes, as the true mathematician and the genuine philoſopher could never reliſh.

TYGER, or TIGER, in zoology. See the article TIGER.

TYLE, or TILE, in building, a ſort of thin, factitious, laminated brick, uſed on the roofs of houſes; or more properly a kind of fat clayey earth, kneaded and moulded, of a juſt thickneſs, dried and burnt in a kiln like a brick, and uſed in the covering and paving of houſes. See the article BRICK.

Tyles are made, ſays Mr. Leybourn, of better earth than brick-earth, and ſomething nearer akin to the potter's earth. According to 17 Edw. IV. the earth for tyles ſhould be caſt up before the firſt of November, ſtirred and turned before the firſt of February, and not made into tyles before the firſt of March; and ſhould likewiſe be tried and ſevered from ſtones, marle, and chalk. For the method of burning them, ſee the article BRICK.

As to the method of applying tyles, ſome lay them dry as they come from the kiln, without mortar or any thing elſe; others lay them in a kind of mortar made of loam and horſe dung. In ſome parts, as in Kent, they lay them in moſs. See the article MORTAR, *&c.*

There are various kinds of tyles, for the various occaſions of building; as plain, thack, ridge, roof, creaſe, gutter, pan, crooked, flemiſh, corner, hip, dormar, ſcallop, aſtragal, traverſe, paving, and dutch tyles.

Plain or thack tyles, are thoſe in ordinary uſe for covering of houſes. They are ſqueezed flat, while yet ſoft, in a mould. They are of an oblong figure, and by 17 Edw. IV. c. 4. are to be $10\frac{1}{2}$ inches long, and $6\frac{1}{4}$ broad, and half an inch and half a quarter thick. But theſe dimenſions are not over ſtrictly kept to.

Ridge, roof or creaſe tyles, are thoſe uſed to cover the ridges of houſes, being made circular breadth-wiſe, like an half cylinder; they are, by the aforeſaid ſtatute, to be 13 inches long, and of the ſame thickneſs with the plain tyles. Hip or corner tyles, are thoſe which lie on the hips or corners of roofs. As to form, they are firſt made flat like plain tyles, but of a quadrangular figure, whoſe two ſides are right lines and two ends arches of circles, one end being a little concave and the other convex. The convex end is to be about ſeven times as broad as the concave end, ſo that they would be triangular but that one corner is taken off; then, before they are burnt, they are bent on a mould breadth-wiſe, like ridge tyles. They have an hole at their narrow end to nail them on by, and are laid with their narrow end upwards; by ſtatute they are to be $10\frac{1}{2}$ inches long, and of a convenient breadth and thickneſs.

Gutter-tiles, are thoſe which lie in gutters or valleys in croſs buildings. They are made like corner tyles, only the corners of the broad end are turned back again with two wings. They have no holes in them, but are laid with the broad end upwards, without any nailing. They are made in the ſame mould as the corner tyles, and have the ſame dimenſions on the convex ſide. Their wings are each four inches broad, and eight long. Pan, crooked, or flemiſh tyles, are uſed in covering of ſheds, lean-to's, and all kinds of flat roof buildings. They are in form of an oblong parallelogram, as plain tyles, but are bent breadth-wiſe forwards and backwards in form of an S, only one of the arches is at leaſt three times as big as the other; which biggeſt arch is always laid uppermoſt, and the leſs arch of another tyle lies over the edge of the great arch of the former. They have no holes for pins, but hang on the laths by a knot of their own earth. They are uſually $14\frac{1}{2}$ inches long, and $10\frac{1}{2}$ broad. By 12 Geo. I. c. 25. they are to be, when

burnt, not leſs than 13½ inches long, and 9½ inches wide, and half an inch thick. Dormar or dorman tyles conſiſt of a plain tyle and a triangular piece of a plain one ſtanding up at right angles to one ſide of the plain tyle, and ſwept with an arch of a circle from the other end, which end terminates in a point. Of theſe tyles there are two kinds, the triangular piece in ſome ſtanding on the right, in others on the left ſide of the plain tyle. And of theſe again there are two kinds, ſome having a plain whole tyle, others but half a plain tyle. But in them all the plain tyle has two holes for the pins at that end where the broad end of the triangular piece ſtands. Their uſe is to be laid in the gutters betwixt the roof and the cheeks or ſides of the dormars, the plain part lying on the roof, and the triangular part ſtanding perpendicularly by the cheek of the dormar; they are excellent to keep out the wet in thoſe places, and yet they are hardly known any where but in Suſſex. The dimenſions of the plain tyle part, are the ſame as thoſe of a plain tyle, and the triangular part is of the ſame length, and its breadth at one end ſeven inches, and at the other nothing. Scallop or aſtragal tyles are in all reſpects like plain tyles, only their lower ends are in form of an aſtragal, *viz.* a ſemicircle with a ſquare on each ſide. They are uſed in ſome places for weather tyling. Tranſverſe tyles, are a kind of irregular plain tyles, having the pin-holes broken out, or one of the lower corners broken off. Theſe are laid with the broken end upwards, upon rafters where pinned tyles cannot hang.

Flemiſh or dutch tyles are of two kinds, antient and modern; the antient were uſed for chimney foot-paces; they were painted with antique figures, and frequently with poſtures of ſoldiers, ſome with compartments, and ſometimes with moreſque devices; but they come much ſhort of the deſign and colours of the modern ones. The modern flemiſh tyles are commonly uſed plaſtered up in the jaumbs of chimneys inſtead of chimney-corner ſtones. Theſe are better glazed, and ſuch as are painted (for ſome are only white) are done with more curious figures and more lively colours than the antient ones. But both kinds ſeem to be made of the ſame whitiſh clay as our white glazed earthen ware; the modern ones are commonly painted with birds, flowers, &c. The antient ones are only five inches and a quarter ſquare, and about three quarters of an inch thick; the modern ones ſix inches and a half ſquare, and three quarters of an inch thick.

TYLER, one that covers or paves with tyles. Tylers and bricklayers were incorporated 10 Eliz. under the name of maſter and wardens of the ſociety of freemen of the myſtery and art of tylers and bricklayers.

TYLWITH, in matters of heraldry and deſcent, is ſometimes uſed for a tribe or family branching out of another, which the modern heralds more uſually call the ſecond or third houſe.

TYMPAN, or TYMPANUM, in architecture, the area of a pediment, being that part which is in a level with the naked of the frieze. Or it is the ſpace included between the three corniches of a triangular pediment, or the two corniches of a circular one.

Sometimes the tympan is cut out, and the part filled with an iron lattice to give light, and ſometimes it is enriched with ſculpture in baſſo-relievo.

TYMPAN, among joiners, is alſo applied to the panels of the doors. See PANEL.

TYMPAN *of an arch*, is a triangular ſpace or table in the corners or ſides of an arch, uſually hollowed, and enriched ſometimes with branches of laurel, olive-tree, or oak, or with trophies, &c. ſometimes with flying figures, as fame, &c. or ſitting figures, as the cardinal virtues.

TYMPAN, among printers, a double frame belonging to the preſs, covered with parchment, on which the blank ſheets are laid in order to be printed off. See the article PTINTING-PRESS.

TYMPANUM, or TYMPAN, in mechanics, a kind of wheel placed round an axis or cylindrical beam, on the top of which are two levers or fixed ſtaves, for the more eaſy turning the axis, in order to raiſe a weight required. The tympanum is much the ſame with the peritrochium, but that the cylinder of the axis of the peritrochium is much ſhorter, and leſs than the cylinder of the tympanum. See AXIS *in peritrochio*.

TYMPANUM *of a machine*, is alſo uſed for an hollow wheel, wherein one or more people, or other animals, walk to turn it; ſuch as that of ſome cranes, calenders, &c. See CRANE, &c.

TYMPANUM, in anatomy, the middle part of the ear. See the article EAR.

TYMPANUM, a drum. See DRUM.

TYMPANY,

TYMPANY, *tympanites*, in medicine, a flatulent tumour or ſwelling of the abdomen or belly, very hard, equable and permanent, whereby the ſkin is ſtretched ſo tight, that when ſtruck it gives a ſound like that of a drum. Hoffman obſerves, that this diſeaſe has been generally accounted, both by the antients and moderns, a ſpecies of dropſy, but very improperly; for though it is often productive of, or complicated with an aſcites, yet it is in itſelf a perfectly diſtinct diſeaſe, and accompanied with no extravaſation of water in the abdomen; perſons who have died of it having been found, on opening the body, with the abdomen as dry as in a ſtate of health; but the ſtomach has been found, in ſome, greatly diſtended with flatulencies, and containing a viſcid humour, though in no great quantity. The inteſtines are alſo uſually found diſtended, and, as it were pellucid, and, on being pricked, they collapſe, without the appearance of any water. And, in ſome caſes, on opening the abdomen, the whole ſwelling has ſubſided, on the excluſion of a groſs flatulence which had diſtended it. The inteſtines have, in ſome ſubjects, been found diſtended to the bigneſs of a man's thigh, in ſome parts, and in others, lower down, ſo contorted and twiſted together, that there could be no paſſage either for the wind or the excrements. It is not uncommon alſo, on diſſection, to find great numbers of worms, of the common long kind, in the inteſtines. See the article DROPSY.

A tympany, without a dropſy, is moſt incident to women after labour, when the lochia have been ſuppreſſed by colds or otherwiſe, or diſcharged in too ſmall quantities; a bad regimen during the lying in, and the omitting to ſwathe the belly properly down, has alſo often a bad effect this way. In caſes of this kind, women find ſoon afterwards the abdomen inflated, with a conſiderable uneaſineſs, a difficulty of breathing, coſtiveneſs, and an unaccountable anxiety. Theſe are the breeding ſymptoms of the approaching tympany; and the ſame often happens after unſkilful treatment in abortions, and after the leaving a part of the lochia behind, or the injuring the uterus in delivery. See DELIVERY.

Children are alſo ſubject to tympanies, when violently afflicted with worms, and ſometimes after the meaſles and ſmall-pox; and if due care is not taken of theſe caſes, at their beginning, the ſuperior parts ſoon become extenuated, and the patients die. Extreme voracity of children alſo, and their eating great quantities of food, at a time when the ſtomach is weak, ſometimes brings on this diſorder.

The tympany is juſtly accounted one of the more dangerous kinds of diſeaſes, ſince the perſons afflicted with it much oftener die than recover. When it is accompanied with a dropſy, it is ſcarce ever cured; and a ſimple tympany in women and children, if neglected at firſt, degenerates into a chronic diſorder, and hardly admits of a cure. Some, indeed, have gone ſo far as to ſay, they never knew a patient, afflicted with a tympany, recover; but this ſeems too raſh a judgment. That diſtention of the abdomen, which is properly called a flatulent colic, is by ſome accounted a ſpecies of tympany; but this is not naturally dangerous, and is eaſily cured, except when it is attended with ſpaſms of the viſcera; in which caſe the medicines given to reſtore the due tone of the inteſtines, are by no means proper in regard to the ſpaſms.

In curing flatulences of the ſtomach and inteſtines, the phyſician's principal intention is to promote a diſcharge of the vapours by the anus, and to attenuate and gently carry off, by ſtool, the tough and viſcid matter which contributes to the generation of the flatulences. For this purpoſe, firſt derivative, diſcutient, and evacuating clyſters are to be uſed, ſuch as thoſe prepared of hyſſop, clary, flowers of common and roman chamomile, tops of yarrow, juniper-berries, and the larger carminative ſeeds, with veal broth, adding a ſufficient quantity of ſal gemmæ, ſal ammoniac, or Epſom ſalt, and the oil of chamomile. But it is to be obſerved, that one or two clyſters are not ſufficient for removing the diſorder, but they are to be frequently repeated. With theſe are to be interpoſed laxatives, poſſeſſed of a carminative, and, at the ſame time, ſomewhat of an anodyne quality. Or, if the patient is ſtrong, and the inflation a real tympanites, two parts of the extractum panchymagogum crollii, with one part of the pilulæ wildeganſi, or of the pilulæ ſtarckii, or pilulæ de ſtyrace, in ſome very ſpirituous carminative water, is to be exhibited. See the article FLATULENCY.

After theſe are to be uſed medicines poſſeſſed of a moderate balſamic principle, and a volatile, oleous, and aromatic ſalt, commonly called carminatives; but the operation of theſe medicines is not to be ſo explained, as if by their ſubtile volatile ſalt they attenuated the matter of the flatulences and rendered it thinner; but rather, becauſe, by invigorating the tone and ſyſtole of the inteſtinal coats, they hinder the ſtagnation of the flatulences, move them from their ſeat, and render them more capable of being eaſily eliminated, or prevent the generation of new flatulences; for, as the deſtroyed periſtaltic motion of the ſtomach and inteſtines is the principal cauſe of flatulences, ſo all medicines which have a remarkable virtue in ſtrengthening theſe parts, are moſt proper for the removal of this diſorder. The beſt and moſt approved of this kind, are powders prepared of the roots of wake-robin, zedoary, and white burnet; the digeſtive ſalt of ſylvius, or vitriolated tartar; cumin ſeeds, the tops of the leſſer centaury, and dried orange-peel, each a drachm, and ſix drops of the genuine oil of chamomile; or of the oil of cedar, or of the oil of orange-peel; to which, if there is a ſuſpicion of an acid lodged in the primæ viæ, we may commodiouſly add crabs eyes.

To this claſs of medicines may be referred the following liquid form: take of the carminative water of Dorncrellius, of the waters of common chamomile and zedoary prepared with wine, each one ounce; of the ſpiritus nitri dulcis, of the pure oil of caraway, eight drops mixed with two drachms of ſugar.

Nor are external remedies, ſuch as liniments applied by way of ointment to the whole epigaſtric region, to be neglected. The principal ingredients of theſe liniments ought to be boiled with oils of chamomile and rue, oil of nutmeg and peruvian balſam, with which may be mixed the oils of juniper, caraway, aniſe, or cumins. But preferable to all others, the liquid balſam of life may be uſed, which when mixed with three parts of Hungary water, and applied by way of ointment to the abdomen, or laid on with a warm linnen-cloth, is found of great efficacy.

TYPE, *typus*, a copy, image, or reſemblance of ſome model. This word is much uſed among divines, to ſignify a ſymbol, ſign, or figure of ſomething to come; in which ſenſe it is commonly uſed with relation to antitype, which is the thing itſelf, whereof the other is a type or figure. See the article ANTITYPE.

TYPE *of Conſtans*, a formulary or model of faith, publiſhed by the emperor Conſtans, who being a favourer of the monothelites, and exaſperated at the little ſucceſs which the ecthеſis of his uncle Heraclius had met with, publiſhed a new formulary in the manner of an edict in 648, forbidding all perſons to make uſe of the expreſſions "one" or "two wills in Jeſus Chriſt." Martin I. condemned the type in the lateran council, *anno* 649, and the ſynod made a canon expreſsly againſt this heretical model; at which the emperor was ſo enraged, that he forced the pope into baniſhment. See ECTHESIS.

TYPE, among letter-founders and printers, the ſame with letter. See the articles LETTER and LETTER-FOUNDERY.

TYPE is alſo uſed to denote the order obſerved in the intenſion and remiſſion of fevers, pulſes, &c.

TYPHA, in botany, a genus of the *monoecia-triandria* claſs of plants, having no corolla: the male flowers are arranged into a cylindric amentum; the female flowers form alſo a cylindric amentum below the male ones; there is no pericarpium, the fruit growing together in great numbers, conſtitutes a cylinder, in each of which there is a ſingle ovated ſeed, furniſhed with a ſtyle, and ſtanding upon a ſeta, which ſeta ſtands on a capillary pappus.

TYPHODES, τύφωδης, or τύφος, in medicine, a kind of ardent or burning fever uſually attending on eryſipelaſes of any of the viſcera. Of this diſorder, according to Hippocrates, there are five ſpecies. The firſt is a legitimate continual fever, which impairs the ſtrength, is accompanied with a pain of the belly, and a preternatural heat of the eyes, hinders the patient from looking ſteadily on any object whatſoever, and renders him unable, in conſequence of the violent pain, to ſpeak. The ſecond ſpecies begins with a tertian or quartan fever. The patient diſcharges a great quantity of ſaliva and worms at his mouth; his eyes are painful, his feet, and ſometimes his whole body, are ſeized with ſoft ſwellings. His breaſt and back are now and then painful; his belly rumbles, his eyes are fierce, he ſpits a great deal, and his ſaliva ſticks to his throat. The third ſpecies is known by intenſe pains in the joints, and ſometimes

over

over all the body; the blood contaminated by the bile, becomes hot, and ſtagnates in the limbs. The fourth ſpecies is known by a violent tenſion, elevation, and heat of the abdomen, ſucceeded by a diarrhœa, which ſometimes ends in a dropſy. The fifth ſpecies is not unlike the firſt. See FEVER.

TYPHOIDEA, in botany, the ſame with phleum. See the article PHLEUM.

TYPHOMANIA, τυφομανια, in medicine, a diſorder of the brain, wherein the patient not being able to ſleep, tho' greatly inclined thereto, lies with his eyes ſhut, talks abſurdly, and flings himſelf this way and that. The typhomania is a kind of combination of a frenzy with a lethargy, and is much the ſame with a coma vigil. See COMA.

TYPOGRAPHY, the art of printing. See the article PRINTING.

TYRANT, *tyrannus*, among the antients, denoted ſimply a king or monarch. But the ill uſe ſeveral perſons inveſted with that ſacred character made of it, has altered the import of the word, and tyrant now carries with it the idea of an unjuſt and cruel prince, who invades the people's liberty, and rules a in more deſpotic manner than the laws of nature or the country do allow of.

TYRE, a port-town of Phœnicia, in Aſiatic Turky, ſituated on the coaſt of the Levant, in eaſt long. 36°, north lat. 32° 32', being antiently the capital of Phœnicia.

TYRNAW, a town of upper Hungary, ſituated thirty-five miles north-eaſt of Preſburg.

TYROCINIUM, a noviciate, or apprenticeſhip, in any art or ſcience.

TYRONE, an iriſh county, in the province of Ulſter; bounded by Londonderry, on the north; by Armagh and Laugh-neagh, on the eaſt; by Monaghan and Fermanagh, on the ſouth; and by Donnagal on the weſt.

TYROSIS, a diſorder of the ſtomach, proceeding from milk coagulated therein.

TYSTED, a town of Denmark, in the province of north Jutland, and territory of Alburg, ſituated on the gulph of Limford, fifty miles weſt of Alburg.

TYTH, or TITHE. See TITHE.

TYTHING. See the article TITHING.

U.

U, or u, the twentieth letter, and fifth vowel, of our alphabet, is formed in the voice by a round configuration of the lips, and a greater extruſion of the under one than in forming the letter o, and the tongue is alſo more cannulated. The ſound is ſhort in *curſt*, *muſt*, *tun*, *tub*; but is lengthened by a final *e*, as in *tune*, *tube*, &c. In ſome words it is rather acute than long; as in *brute*, *flute*, *lute*, &c. It is moſtly long in polyſyllables; as in *union*, *curious*, &c. but in ſome words it is obſcure, as in *nature*, *venture*, &c. This letter in the form V, or v, is properly a conſonant, and as ſuch is placed before all the vowels; as in *vacant*, *venal*, *vibrate*, &c. Though the letters v and u had always two ſounds, they had only the form v till the beginning of the fourth century, when the other form was introduced, the inconvenience of expreſſing two different ſounds by the ſame letter having been obſerved long before. In numerals V ſtands for five; and with a daſh added at top, thus $\overline{V}$, it ſignifies five thouſand.

In abreviations, amongſt the Romans, V. A. ſtood for Veterani aſſignati; V. B. viro bono; V. B. A. viri boni arbitratu; V. B. F. vir bonæ fidei; V. C. vir conſularis; V. C. C. F. vale, conjux chariſſime, feliciter: V. D. D. voto dedicatur; V. G. verbi gratia; Vir. Ve. virgo veſtalis; V L. videlicet; V. N. quinto nonarum.

VABRES, a town of Guienne, in France, fifty-five miles north-eaſt of Toulouſe.

VACANCY, in philoſophy. See the article VACUUM.

VACANCY, in law, a poſt, or benefice, wanting a regular officer or incumbent.

VACANT,

VACANT EFFECTS, *prædia vacata*, or *vacua*, are ſuch as are abandoned for want of an heir, after the death or flight of their former owner. A romiſh benefice is ſaid to be vacant in curia Romana, when the incumbent dies in Rome, or within twenty leagues thereof, though it be only by accident that he was there. The pope nominates to all ſuch benefices.

VACATION, in law, is the whole time betwixt the end of one term and the beginning of another. See TERM.

This word is alſo applied to the time from the death of a biſhop, or other ſpiritual perſon, till the biſhopric, or dignity, is ſupplied with another.

VACCA MARINA, the SEA-COW, in zoology, the ſame with the thrichecus. See the article THRICHECUS.

VACHA, a town of Germany, forty miles ſouth-eaſt of Heſſe-Caſſel.

VACCINIUM, in botany, a genus of the *octandria-monogynia* claſs of plants, the corolla whereof conſiſts of a ſingle petal, of a campanulated form, and divided into four revolute ſegments: at the edge the fruit is a globoſe, umbilicated berry, containing four cells: the ſeeds are few and ſmall.

This genus comprehends the black whortle-berries and the marſh-whortle.

VACUUM, or VACUITY, in philoſophy, denotes a ſpace empty, or devoid, of all matter or body. See the articles BODY and SPACE.

It has been the opinion of ſome philoſophers, particularly the Carteſians, that nature admits not a vacuum, but that the univerſe is entirely full of matter: in conſequence of which opinion they were obliged to aſſert, that if every thing contained in a veſſel could be taken out or annihilated, the ſides of that veſſel, however ſtrong, would come together; but this is contrary to experience, for the greateſt part of the air may be drawn out of a veſſel by means of the air-pump, notwithſtanding which it will remain whole, if its ſides are ſtrong enough to ſupport the weight of the incumbent atmoſphere.

Should it be objected here, that it is impoſſible to extract all the air out of a veſſel, and that there will not be a vacuum on that account; the anſwer is, that ſince a very great part of the air that was in the veſſel may be drawn out, as appears by the more quick deſcent of light bodies in a receiver when exhauſted of its air, there muſt be ſome vacuities between the parts of the remaining air; which is ſufficient to conſtitute a vacuum. Indeed, to this it may be objected by a carteſian, that thoſe vacuities are filled with materia ſubtilis, that paſſes freely through the ſides of the veſſel, and gives no reſiſtance to the falling bodies: but, as the exiſtence of this materia ſubtilis can never be proved, we are not obliged to allow the objection, eſpecially ſince Sir Iſaac Newton has found, that all matter affords a reſiſtance nearly in proportion to its denſity. See the articles PLENUM and CARTESIAN.

There are many other arguments to prove this, particularly the motions of the comets through the heavenly regions, without any ſenſible reſiſtance; the different weight of bodies of the ſame bulk, *&c.*

All the parts of ſpaces, ſays Sir Iſaac Newton, are not equally full; for if they were, the ſpecific gravity of the fluid which would fill the region of the air, could not, by reaſon of the exceeding great denſity of its matter, give way to the ſpecific gravity of quickſilver, gold, or any body, how denſe ſoever: whence neither gold, nor any other body, could deſcend in the air; for no body can deſcend in a fluid, unleſs it be ſpecifically heavier than it. But, if a quantity of matter may, by rarefaction, be diminiſhed in a given ſpace, why may it not diminiſh in infinitum? And if all the ſolid particles of bodies are of the ſame denſity, and cannot be rarified, without leaving pores, there muſt be a vacuum.

VACUUM BOYLEANUM is ſometimes, though improperly, uſed to expreſs the approach to a real vacuum, by means of an air-pump. See the laſt article.

VADA, a port-town of Tuſcany, ten miles ſouth of Leghorn.

VADARI, in the civil-law, denotes a perſon to pledge, undertake, or give ſecurity, in behalf of another, that he ſhall, on a certain day, appear in court to proſecute or anſwer.

VADE-MECUM, or VENI-MECUM, a latin phraſe, uſed, in Engliſh, to expreſs a thing that is very handy and familiar, and which one uſually carries about with them; chiefly applied to ſome favourite book.

VADIMONIUM, in the civil-law, a promiſe, or bond, given for appearance before the judge upon a day appointed.

VADO, a port-town of Italy, belonging to the Genoeſe, thirty-ſix miles ſouth-weſt of Genoa.

VAENA, a town of Andaluſia, in Spain, twenty-five miles ſouth-eaſt of Cordova: weſt long. 4° 6′, north lat. 37° 30′.

VAGABOND, or VAGRANT, in law. See the article VAGRANT.

VAGINA, properly ſignifies a ſheath, or ſcabbard: and the term vagina is uſed, in architecture, for the part of a terminus, becauſe reſembling a ſheath, out of which the ſtatue ſeems to iſſue.

VAGINA, in anatomy, a large canal, formed of a robuſt and ſtrong membrane, and reaching from the external orifice, or os pudendi, in women, to the uterus. See PUDENDUM and UTERUS.

The vagina is uſually about ſix or ſeven fingers breadth long; but is very diſtenſible, and capable of great dilatation; its orifice is narrower than any other part, and cloſed by a ſphincter-muſcle: its ſubſtance is membranaceous, and rugoſe internally, and furniſhed with abundance of nervous papillæ; and to this is owing its quick ſenſation: externally it is muſcular, whereby it is enabled to embrace the penis more cloſely in coitu. The rugæ are largeſt in maids, and eſpecially in the anterior part of the vagina; in married women they are much fainter, and ſeem as if worn down; and in women who have born children, they are almoſt entirely obliterated. Their uſe is to encreaſe the pleaſure in coitu, both to the man and to the woman; and to render the part capable of the neceſſary dilatation in parturition. See DELIVERY.

About the mouth of the vagina are found certain lacunæ, or ſmall orifices, capable of admitting a briſtle: they proceed from the glandulæ ſubſtratæ, and ſerve to ſecrete a liquor for lubricating the vagina, and for ſtimulating to venery. See the article LACUNÆ, &c.

The ſphincter, or contracting muſcle, of the vagina, is compoſed of a ſeries of muſcular fibres, ariſing from the ſphincter of the anus, and ſurrounding the orifice of the vagina, after which it is inſerted under the crura of the clitoris. See the article CLITORIS.

The uſe of the vagina is to receive the penis in coition, to emit from the womb the menſtrual diſcharges, the fœtus, the ſecundines, and lochia. See the articles MENSES, DELIVERY, &c.

VAGINALIS, or ELYTHROIDES, in anatomy. See ELYTHROIDES.

VAGRANTS, in law, are deſcribed to be perſons pretending to be patent-gatherers, or collectors for priſons, and wander about for that end; among which are included all fencers, bear-wards, common players of interludes, minſtrels, juglers; all perſons pretending to be gypſies, or wandering in the habits of ſuch, or pretending ſkill in phyſiognomy, palmeſtry, or the like, or to tell fortunes; all ſuch as uſe any ſubtle craft, unlawful games or plays; or, being able in body, run away, leaving their wives or children to the pariſh; all perſons who cannot otherwiſe maintain themſelves, that loiter about and refuſe to work for the uſual wages; and all other perſons wandering abroad and begging, &c.

It is enacted, that where any ſuch vagrants ſhall be found in a pariſh, the conſtable, or other officer, is immediately to apprehend them, and carry them before ſome juſtice of the peace, who ſhall examine the perſons on oath, as to their condition, and places of abode; and thereupon order them to be ſent by paſs to the place of their laſt legal ſettlement; or if that cannot be known, to the place of their birth. The juſtice is to give the conſtable a certificate aſcertaining how, and in what manner, they ſhall be conveyed, &c. And juſtices of the piece, in their ſeſſions, have power to appoint rates for paſſing of vagrants, at ſo much per mile. All conſtables are to make ſearches for theſe people before every quarter-ſeſſions: and in caſe any perſons permit vagrants to lodge in their houſes, barns, or out-houſes, and do not carry them before the next juſtice, or give notice to ſome conſtable, or other pariſh-officer, ſo to do, they ſhall forfeit a ſum not above 40s. or under 10s. Alſo, if any charge be brought upon any place by means thereof, the ſame may be levied by diſtreſs and ſale of the offender's goods; for want of which he ſhall be committed to the houſe of correction, and there ſet to hard labour for three months.

VAGUM, or PAR VAGUM, in anatomy, the eighth pair of the nerves ariſing from the medulla oblongata. See NERVE.

VAIHINGEN, a town of Swabia, in Germany, ſituated on the river Neckar, twenty-ſix miles ſouth-weſt of Hailbron.

VAIR, in heraldry, a kind of fur, conſiſting of divers little pieces, argent and azure, reſembling a dutch U, or a bell-glaſs. See plate CCLXXXVIII. fig. 3.

Vairs have their point azure oppoſite their point argent, and the baſe argent to the baſe azure.

VAIRY, VAIRE, VERRY, or VARRY, in heraldry, expreſſes a coat, or the bearings of a coat, when charged or chequered with vairs: and hence, vairy-cuppy, or vairy-taſſy, is a bearing compoſed of pieces repreſenting the tops of crutches. See plate CCLXXXVIII. fig. 4.

VAISON, a town of Provence, in France, twenty-nine miles north-eaſt of Avignon.

VALAIS, a territory of Switzerland, being a long valley of an hundred miles extent, lying between the head of the river Rhone and the lake of Geneva.

VALANTIA, CRESS-WORT, in botany, a genus of the *polygamia-monoecia* claſs of plants, the corolla of which is monopetalous, but divided into three or four parts; the ſtamina are either three or four; the pericarpium is coriaceous and compreſſed, and contains a ſingle globoſe ſeed. See plate CCXC. fig. 1.

VALDENSES, in church-hiſtory, the ſame with the albigenſes. See the article ALBIGENSES.

VALDIA, in botany, a plant otherwiſe called ovieda. See OVIEDA.

VALENCE, a town of Dauphine, in France, ſituated at the confluence of the rivers Rhone and Iſere, forty-eight miles ſouth of Lyons.

VALENCIA, the capital of a province of the ſame name, in Spain, ſituated in a fine plain on the river Guadalaviar: weſt lon. 35′, north lat. 39° 20′.

VALENCIA, or VALENZA DE ALCANTARA, a town of Eſtremadura, in Spain, near the frontiers of Portugal: weſt long. 7° 30′, and north lat. 39° 15′.

VALENCIA is alſo a town of Terra Firma: weſt long. 67° 30′, north lat. 10°.

VALENCIENNES, a city of french Hainault, ſituated on the river Schelde, fifteen miles ſouth of Tournay, and eighteen miles ſouth-weſt of Mons.

VALENTINIANS, in church-hiſtory, a ſect of chriſtian heretics, who ſprung up in the IId century, and were ſo called from their leader Valentinus.

The valentinians were only a branch of the gnoſtics, who realized or perſonified the platonic ideas, concerning the deity, whom they called Pleroma, or plenitude. Their ſyſtem was this: the firſt principle is Bythos, *i. e.* depth, which remained many ages unknown, having with it Ennoe, or thought, and Sige, or ſilence; from theſe ſprung the Nous, or intelligence, which is the only ſon, equal to, and alone capable of comprehending, the Bythos; the ſiſter of Nous they called Aletheia, or truth: and theſe conſtituted the firſt quaternity of æons, which were the ſource and original of all the reſt: for Nous and Aletheia produced the World and Life; and from theſe two proceeded Man and the Church. But beſides theſe eight principal æons, there were twenty-two more, the laſt of which, called Sophia, being deſirous to arrive at the knowledge of Bythos, gave herſelf a great deal of uneaſineſs, which created in her Anger and Fear, of which was born Matter. But the Horos, or bounder, ſtopped her, preſerved her in the Pleroma, and reſtored her to perfection. Sophia then produced the Chriſt and the Holy Spirit, which brought the æons to their laſt perfection, and made every one of them contribute their utmoſt to form the Saviour. Her Enthymeſe, or thought, dwelling near the Pleroma, perfected by the Chriſt, produced every thing that is in the world, by its divers paſſions. The Chriſt ſent into it the Saviour, accompanied with angels, who delivered it from its paſſions, without annihilating it: from thence was formed corporeal matter. And in this manner did they romance, concerning God, nature, and the myſteries of the chriſtian religion.

VALENZA, a town of Italy, ſituated on the river Po, forty-three miles ſouth-weſt of Milan.

VALERIAN, *valeriana*, in botany, a genus of the *triandria-monogynia* claſs of plants, the flower of which conſiſts of a ſingle petal, in form of a tube, prominent in its inferior part, and containing a honey-juice, divided into five ſegments at the edge, all which are obtuſe; the fruit is a capſule, that ſplits and falls off; and the ſeeds are ſingle and oblong. Theſe are the characters of the genus; but there is great variation among the different ſpecies.

The valerians may be known, when not in flower, by their roots being ſcented, and their leaves always ſtanding two at a ſtalk. The great garden-valerian is an alexipharmic, ſudorific, and diuretic. The root is the only part of it uſed in medicine: this is to be taken up in September, and carefully dried. It is given in powder, in aſthmas, pleuriſies, coughs, obſtructions of the liver and ſpleen, and in the plague, and all malignant and petechial

Fig. 2. VALLISNERIA.

Fig. 1. VALANTIA.

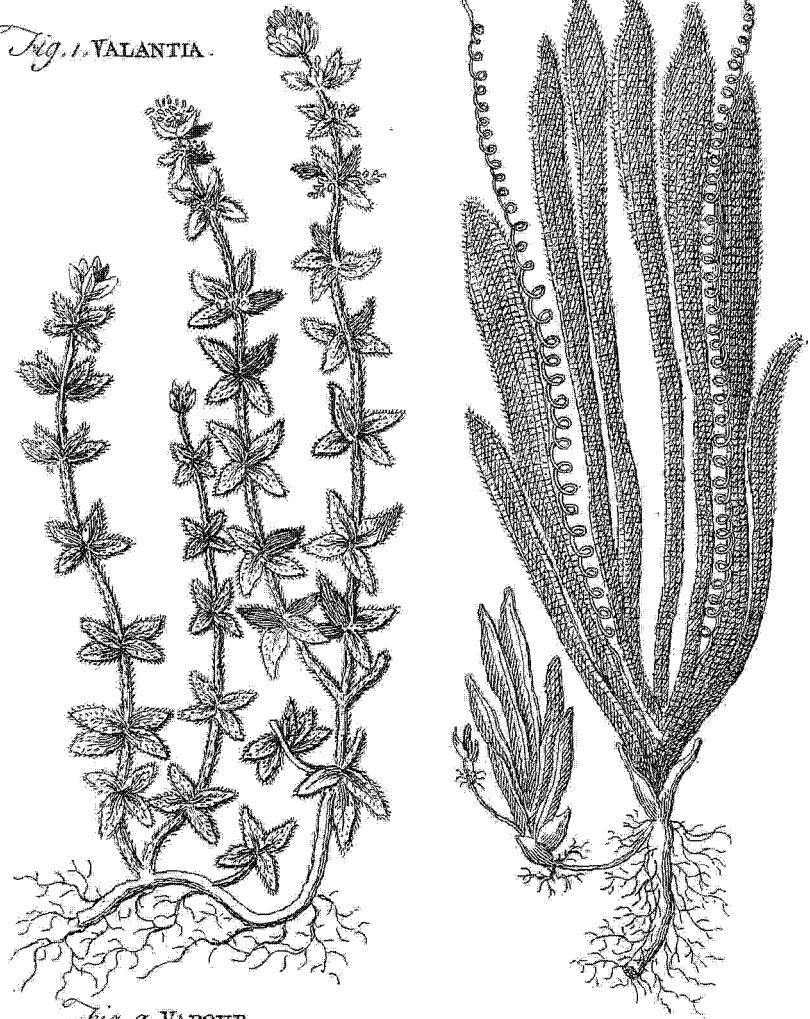


Fig. 3. VAPOUR.

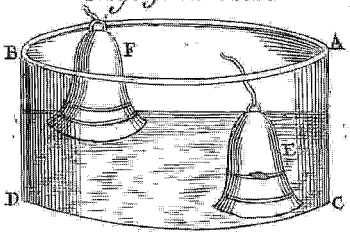


Fig. 4. VERT.

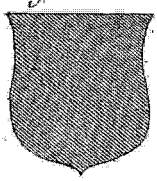
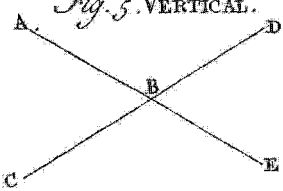


Fig. 5. VERTICAL.



T. Jefferys sculp.

ſtechial fevers. It is alſo recommended by ſome as a vulnerary, and by others as one of the greateſt medicines in the world for weakneſſes of ſight.

The wild valerian-root is much more famous than this, but in a different intention: it is of a ſtrong diſagreeable ſmell, and is given in nervous caſes with very great ſucceſs; there are not wanting inſtances of perſons cured of confirmed epilepſies by it; and in all convulſions it is a very ſucceſsful medicine.

VALET, a french term, uſed as a common name for all domeſtic men ſervants, employed in the more ſervile offices, as grooms, footmen, coachmen, *&c.* But with us, it is only uſed in the phraſe valet de chambre, which is a ſervant whoſe office is to dreſs and undreſs his maſter, *&c.*

VALETUDINARY, *valetudinarius*, among medical writers, denotes a perſon of a weak and ſickly conſtitution, and frequently out of order.

VALID, in law, an appellation given to acts, deeds, tranſactions, *&c.* which are clothed with all the formalities requiſite to their being put into execution, and to their being admitted in a court of juſtice. See ACT, DEED, *&c.*

VALKENBURG, or FAUQUEMONT, a town of the auſtrian Netherlands, nine miles eaſt of Maeſtricht.

VALKOWAR, a town of Sclavonia, ſituated on the Danube, ſixty miles north-weſt of Belgrade.

VALLADOLID, a city of old Caſtile, in Spain, eighty-ſix miles north-weſt of Madrid: weſt lon. 4° 50′, and north lat. 41° 36′.

VALLADOLID is alſo a town of Mexico, ſituated in the province of Honduras: weſt long. 91°, and north lat. 14°.

VALLAR CROWN, *vallaris corona*, in roman antiquity, the ſame with that otherwiſe called caſtrenſis. See CROWN.

VALLENGIN, the capital of a county of the ſame name, in Switzerland, ſituated near the lake of Neufchattel, twenty-five miles north-weſt of Bern.

VALLERY, or *St.* VALLERY, a port-town of Picardy, in France, ſituated on the Engliſh channel, forty-five miles north of Rouen.

VALLISNERIA, in botany, a genus of the *dioecia-diandria* claſs of plants, with a monopetalous tripartite flower; its fruit is a long, cylindraceous, and unilocular capſule, containing numerous oval ſeeds. See plate CCXC. fig 2.

VALOIS, a dutchy of France, ſituated on the three great rivers the Seine, the Marne, and the Oyſe.

VALONA, a port-town of Albania, in european Turky, ſituated on a fine bay of the gulph of Venice: eaſt lon. 20° 5′, and north lat. 41° 6′.

VALPARISA, a port-town of Chili, ſituated on the Pacific ocean, in weſt long. 77°, and ſouth lat. 33°.

VALTELINE, a fine fruitful valley, in the ſouth-eaſt diviſion of the country of the Griſons.

VALUE, *valor*, in commerce, denotes the price or worth of any thing: hence the intrinſic value denotes the real and effective worth of a thing, and is uſed chiefly with regard to money, the popular value whereof may be raiſed and lowered, at the pleaſure of the prince; but its real, or intrinſic value, depending wholly on its weight and fineneſs, is not at all affected by the ſtamp or impreſſion thereon.

Value in bills of exchange, is uſed to ſignify the nature of the thing (as ready money, bills, debts, merchandizes, *&c.*) which is given, as it were, in exchange, for the ſum ſpecified in the bill. From four different manners of expreſſing this value, ſome diſtinguiſh four kinds of bills of exchange. The firſt bears value received, ſimply and purely, which comprehends all kinds of value; the ſecond value received in money or merchandize; the third value of myſelf; and the fourth underſtood. See the article BILL.

VALVE, *valvula*, in hydraulics, pneumatics, *&c.* is a kind of lid, or cover, of a tube or veſſel, ſo contrived as to open one way; but which, the more forcibly it is preſſed the other way, the cloſer it ſhuts the aperture; ſo that it either admits the entrance of a fluid into the tube or veſſel, and prevents its return; or admits its eſcape, and prevents its re-entrance. See the article PUMP.

Mr. Belidor has invented a new kind of valves, the deſcription of which may not be unacceptable to the reader. See plate CCXCI. where fig. 1. repreſents a round plate of braſs, one half of which is chamfered upwards, and the other half downwards. The part C A D, which is greater by one twelfth than the other part B, is tapered on the under ſide from L to A, as is more evident in fig. 5. *ibid.* where the ſame letters are uſed. The part B, is tapered on the upper ſide, as may alſo be ſeen in fig. 7. at B M. On the

upper ſide of this plate, nearer B than the center G, is ſcrewed on an axis EHF, on which the plate turns. Fig. 2. ſhews how this axis is faſtened to the plate. Fig. 3. repreſents the box, or bed, of the valve, chamfered downward on all the ſemi-circular ſide L, to receive the part AL, of fig. 1. and the other part B, quite to AA, where the pivots of the axis reſt, is chamfered upwards, to receive the part B, of fig. 1. coming up againſt it. From theſe chamfered edges on the inſide, this bed of the valve ſpreads into a flat ring, to be pinched between the flaunches of the pipes, which are ſcrewed together, to make all tight. Fig. 4. repreſents the ſection of this bed; OP being its upper part chamfered downwards, to receive GLA, the greater part of the valve of fig. 1. falling upon it; and QR chamfered upwards, receives the ſmalleſt part B, of fig. 1. riſing againſt it as it ſhuts. The valve, thus ſhut in its bed, is repreſented in fig. 5. where it may be obſerved, that the pivots of the axis are kept in their places by ſemi-circular bridles, that go over them at C and D. The ſection of the ſame valve ſhut, may be ſeen in fig. 6. where MBHG, repreſents the lower and leſſer part of the valve ſhut, and applied upwards to the under part of the bed at QR; and LAGH repreſents the greater part of the valve ſhut and applied downwards to the bed at OP. K ſhews one of the bridles pinned, which holds down the pivots, or ends of the axis. Fig. 7. ſhews the valve open, and the manner of its play; where all the paſſage being open between QK and BIL, and between PO and MHA, it is plain that here is the greateſt water-way poſſible. Now when the valve ſhuts, the end BM moves in the direction of the pricked curve line MQ, and the end LA in the direction of the pricked line LO. When the water is coming downwards, it muſt puſh hard on the part GAL, in fig. 1, 5, 6, and 7. and thereby make the part BH to riſe, by which means the valve will be cloſe ſhut. But when the water comes upwards, as it preſſes with moſt force on the ſurface GA, the part HB will come down, and the valve will immediately open.

VALVE, in anatomy, a thin membrane applied on ſeveral cavities and veſſels of the body, to afford a paſſage to certain humours going one way, and prevent their reflux towards the place from whence they came. The veins and lymphatics are furniſhed with valves, which open towards the heart, but keep cloſe towards the extremities of thoſe veſſels; that is, they let the blood and lymph paſs towards the heart, but prevent their returning towards the extreme parts from whence they came. See the article VEIN, HEART, ARTERY, *&c.*

VALVERDE, a town of Portugal, ſituated near the frontiers of ſpaniſh Eſtramadura, twenty-ſeven miles north of Alcantara.

VAN, VANT, or VAUNT, a term derived from the french *avant*, or *avaunt*, ſignifying *before*, or *foremoſt* of any thing: thus we ſay, the van-guard of an army, *&c.* See the article GUARD.

VAN is alſo the name of a city of aſiatic Turky, ſituated on a lake of the ſame name, in the province of Turcomania: eaſt lon. 44° 30′, and north lat. 38° 30′.

VANDALIA, the antient name of the countries of Mecklenburg and Pomerania, in Germany.

VANES, on mathematical inſtruments, are ſights made to move and ſlide upon croſs-ſtaves, fore-ſtaves, quadrants, *&c.* See the article CROSS-STAFF, *&c.*

VANILLA, in botany, the name by which many call the black-flowered and ſweet-podded epidendrum. See EPIDENDRUM.

In commerce, *&c.* the term vanilla is chiefly applied to the pod of this plant, which is brought to us entire, and with the ſeeds in it; being uſually about five or ſix inches long, and half an inch broad, and containing an almoſt innumerable quantity of minute and gloſſy black ſeeds.

Vanilla grows in the warmer parts of America, and that uſually in places where there is water near. The natives diſtinguiſh it into three kinds, which the Spaniards call the pompona, the ley, and the ſimarona. The pods of the pompona-kind are thick and ſhort; thoſe of the kind called ley, are longer and ſlenderer; and thoſe of the ſimarona, which is alſo called baſtard-vanilla, are the ſmalleſt of all the kinds. The ley-kind is the only good vanilla. It ought to be of a good reddiſh brown, neither too black nor too red, and neither too dry, nor too moiſt; when perfect, they always appear full, though dry; and a parcel of fifty in number ought to weigh above five ounces. There is a kind which is larger, fifty pods

Belidor's New VALVE.

Fig. 1

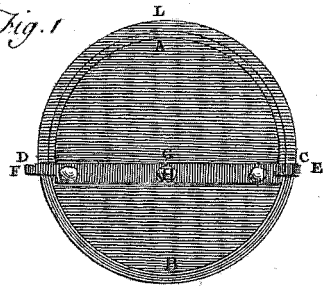


Fig. 3.

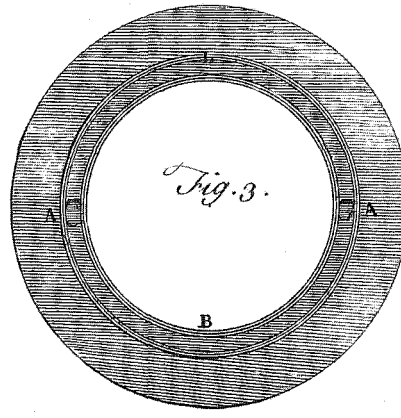


Fig. 2.

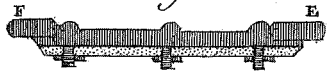


Fig. 4

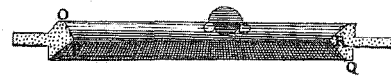


Fig. 5.

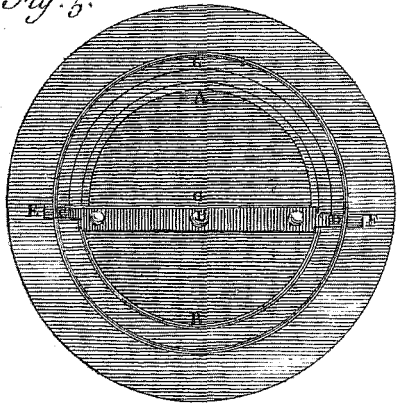


Fig. 7.

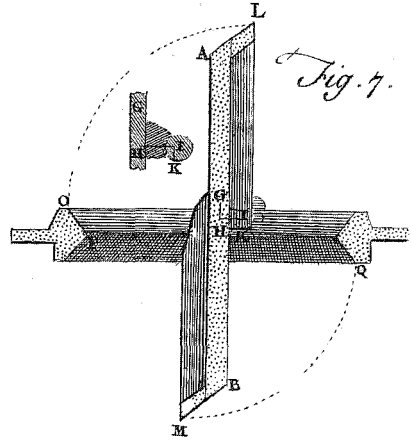


Fig. 6

T. Jeffreys sculp

of which uſually weigh eight ounces; this is called the ſobre buena, and is eſteemed of all others the moſt excellent.

The ſmell of vanillas ought to be penetrating and agreeable. And when the pods are freſh, and in good condition, they are found, when opened, to be full of a blackiſh, oily, balſamic liquor, in which there ſwim a great number of very ſmall black ſeeds. The ſmell, when the pod is freſh opened, is very lively, and in ſome degree intoxicating.

The pompona-vanilla has a ſtronger but leſs agreeable ſmell than the former; and, when taken, gives men violent head-achs, and women diſorders of the womb.

The liquid ſubſtance in the pompona is thinner than in the ley, and the ſeeds much larger, being nearly of the ſize of thoſe of muſtard.

The ſimarona, or baſtard-vanilla, has very little liquor, has few ſeeds in the pod, and has ſcarce any ſmell.

The pompona and ſimarona are no ſaleable commodities, nor ever brought to market, except cunningly by the Indians, who mix them among the pods of the ley, or true kind. It is not yet certainly known, however, whether theſe three kinds are the produce of different ſpecies of plants, or whether they differ only as to age, or the ſoil where the plant grows.

The time of gathering the pods for ſale, is from September to December. They require no other management than to be gathered in a dry ſeaſon, and laid twenty days, to dry away the ſuperfluous humidity, and, at times, preſſing the pods gently with the hands.

Vanillas are accounted cordial, carminative, ſtomachic, and reſtorative; they are alſo ſaid to be diuretic, and to promote the menſes.

VANNES, or VENNES, a city of Britany, in France, ſituated near the bay of Biſcay, fifty miles north-weſt of Nantz.

VAPORARIUM, in chemiſtry, a vapour-bath; wherein the body, containing the ingredients, is ſo placed as to receive the fumes of boiling water. See the articles BATH and HEAT.

VAPOUR, *vapor*, in philoſophy, the moiſt and moſt volatile particles of bodies, ſeparated by heat, and raiſed into the atmoſphere. See the articles EXHALATION and ATMOSPHERE.

That vapours are raiſed from the ſurface of water, and moiſt bodies, by the action of the ſun's heat, is agreed on by all: but the manner in which this is done, continues ſtill a controverted point among philoſophers. If we conſult a carteſian upon this head, he immediately tells us, that ſmall particles of water being formed into hollow ſpheres by the ſun's heat, filled with their materia ſubtilis, and by that means becoming lighter than air, are eaſily buoyed up in it: but as this materia ſubtilis is only a fiction, this ſolution is not to be regarded. See the article VACUUM.

Dr. Nieuwentyt, and ſeveral other philoſophers who maintain, that fire is a particular ſubſtance diſtinct from other matter, account for the formation and aſcent of vapours thus: they ſay, that the rays of the ſun, or particles of fire ſeparated from them, adhering to particles of the water, make up little bodies, lighter than an equal bulk of air; which, therefore, by the laws of hydroſtatics, will aſcend in it, till they come to an height where the air is of the ſame ſpecific gravity with themſelves; and that rain is produced by the ſeparation of the particles of the fire from thoſe of the water; which laſt, being then left without ſupport, can no longer be ſuſtained by the air, but falls down in drops of rain. See RAIN, DEW, *&c.*

This opinion is liable to the following difficulties: firſt, fire has never been yet proved to be a diſtinct element, or a particular ſubſtance; and the change of weight in bodies in chemical preparations, heretofore thought to ariſe from the adheſion of particles of fire, is found to proceed from the adheſion of particles of air. See FIRE and AIR.

Secondly, ſhould the above-mentioned ſuppoſition be allowed, the fiery particles, which are joined to the watery ones to buoy them up, muſt be conſiderably large, or elſe a very great number muſt fix upon a ſingle particle of water; and then a perſon, being on the top of an hill in the cloud, would be ſenſible of the heat, and find the rain, produced from that vapour, much colder than the vapour itſelf: whereas the contrary is evident to our ſenſes; the tops of hills, though in the clouds, being much colder than the rain which falls below.

Beſides, the manner in which the particles of water ſhould be ſeparated from thoſe of the fire, ſo as to fall in rain, is not eaſily to be conceived.

The moſt generally received opinion is, that by the action of the ſun on the ſurface of the water, the aqueous particles

become formed into bubbles, filled with a flatus, or warm air, which renders them ſpecifically lighter than common air, and makes them riſe therein, till they meet with ſuch as is of the ſame ſpecific gravity with themſelves. But Mr. Rowning aſks, Firſt, How comes the air in the bubbles to be ſpecifically lighter than that without, ſince the ſun's rays, which act upon the water from whence they are raiſed, are equally denſe over all its ſurface? Secondly, If it could be poſſible for rarer air to be ſeparated from the denſer ambient air, to form the bubbles (as bubbles of ſoaped water are blown up by warm air from the lungs, whilſt the ambient air is colder and denſer) what would hinder the external air from reducing that, which is incloſed in the bubbles, immediately to the ſame degree of coldneſs and ſpecific gravity with itſelf (cold being readily communicated thro' ſuch thin ſhells of water); by which means, the bubbles would become ſpecifically heavier than the circumambient air, and would no longer be ſupported therein, but fall down, almoſt as ſoon as they were formed?

Thirdly, If we ſhould grant all the reſt of the ſuppoſition, yet the following difficulty will ſtill remain. If clouds are made up of bubbles of water filled with air, why do not theſe bubbles always expand, when the ambient air is rarefied, and preſſes leſs upon them than it did before; and why are they not condenſed, when the ambient air is condenſed by the accumulation of the ſuperior air? But if this condenſation and rarefaction ſhould happen to them, the clouds would always continue at the ſame height, contrary to obſervation; and we ſhould never have any rain.

The two laſt opinions are more largely examined by Dr. Deſaguliers in the Philoſophical Tranſactions, n° 407. After which, he endeavours to eſtabliſh one of his own.

He obſerves, with Sir Iſaac Newton, that, when by heat or fermentation the particles of a body are ſeparated from their contact, their repulſive force grows ſtronger, and the particles exert that force at greater diſtances; ſo that the ſame body ſhould be expanded into a very large ſpace, by becoming fluid; and may ſometimes take up more than a million of times the room it did in a ſolid and incompreſſible ſtate. "Thus, ſays he, if the particles of water are turned into vapour, by repelling each other ſtrongly, and repel air more than they repel each other; aggregates of ſuch particles, made up of vapour and vacuity, may ariſe in air of different denſities, according to their own denſity depending on their degree of heat." He obſerves farther, that heat acts more powerfully on water, than on common air; for that the ſame degree of heat, which rarefies air two-thirds, will rarefy water near fourteen thouſand times, changing it into ſteam or vapour, as it boils it. And in winter, that ſmall degree of heat, which, in reſpect of our bodies, appears cold, will raiſe a ſteam or vapour from water, at the ſame time that it condenſes air. Laſtly, he obſerves, that the denſity and rarity of this vapour depends chiefly on its degree of heat, and but little on the preſſure of the circumambient air. From all which he infers, that the vapour being more rarefied near the ſurface of the earth, than the air is there by the ſame degree of heat, muſt neceſſarily be buoyed up into the atmoſphere; and ſince it does not expand itſelf much, though the preſſure of the incumbent air grows leſs, at length it finds a place where the atmoſphere is of the ſame ſpecific gravity with itſelf, and there floats, till, by ſome accident or other, it is converted again into drops of water, and falls down in rain.

And to ſhew that air is not neceſſary for the formation of ſteam or vapour, he gives us this experiment: A B C D (plate CCXC. fig. 3.) is a pretty large veſſel of water, which muſt be ſet upon the fire to boil. In this veſſel muſt be ſuſpended the glaſs bell E, made heavy enough to ſink in water; but put in, in ſuch a manner, that it be filled with water, when upright, without any bubbles of air at its crown within, the crown being all under water. As the water boils, the bell will, by degrees, be emptied of its water, the water in the bell being preſſed down by the ſteam which riſes from it; but, as that ſteam has the appearance of air, in order to know whether it be air or not, take the veſſel off the fire, and draw up the bell by a ſtring faſtened to its knob or top, till only the mouth remains under water; then, as the ſteam condenſes by the cold air on the outſide of the bell, the water will riſe up into the bell at F, quite to the top, without any bubble above; which ſhews, that the ſteam, which kept out the water, was not air.

VAPOURS, in medicine, a diſeaſe properly called hypo, or the hypochondrical diſeaſe, and in men, particularly, the ſpleen. See HYPOCHONDRIAC PASSION.

VARI, in medicine, little hard and ruddy tumours, which frequently infeſt the faces of young perſons of a hot temperament of body; for curing which cathartics, and a cooling diluting diet are moſt proper.

VARIABLE QUANTITIES, in geometry and analytics, denote ſuch as are either continually increaſing or diminiſhing; in oppoſition to thoſe which are conſtant, remaining always the ſame. See the article QUANTITY and FLUXION.

VARIANCE, in law, is an alteration of ſomething formerly laid in a plea: but where a plea is good in ſubſtance, it is held, that a ſmall variance ſhall not hurt it. Where the defendant pleads variance between a writ and declaration, he muſt crave oyer of the writ before he ſhall take any advantage thereof; and this is becauſe the writ and the declaration are not upon the ſame roll: it is likewiſe obſerved, that if in one roll a declaration is entered as in debt, and in another as in treſpaſs, this is ſuch a variance, that if the plaintiff has judgment it ſhall be reverſed.

By the 16 and 17 Car. II. c. 8. all variances, *&c.* that are not againſt the right of the matter of the ſuit, ſhall be amended.

VARIATION, in geography and navigation, is the deviation of the magnetical needle, in the mariner's compaſs, from the true north-point, towards either the eaſt or weſt; or, it is an arch of the horizon, intercepted between the meridian of the place of obſervation and the magnetic meridian. See NEEDLE.

The cauſe of this variation of the needle has remained hitherto without any demonſtrative diſcovery; yet ſince its declination, and inclination (or dipping) do both of them manifeſtly indicate the cauſe to be ſomewhere in the earth, it has given occaſion to philoſophers to frame hypotheſes for a ſolution, which make the earth a large or general magnet or loadſtone, of which all the leſſer ones are but ſo many parts or fragments, and being poſſeſſed of the ſame virtue, will, when left to move freely, have the ſame diſpoſition and ſimilarity of poſition, and other circumſtances. See EARTH and MAGNET.

The moſt conſiderable of theſe hypotheſes is that of the late ſagacious Dr. Halley, which is this: the globe of the earth is one great magnet, having four magnetical poles or points of attraction, near each pole of the equator two; and that in thoſe parts of the world which lie near adjacent to any one of thoſe magnetical poles, the needle is chiefly governed thereby, the neareſt pole being always predominant over the more remote one. Of the north poles, that which is neareſt to us, he ſuppoſes to be in the meridian of the land's end, which governs the variations in Europe, Tartary, and the North-ſea; the other he places in a meridian paſſing through California, about 15° from the north pole of the world, which governs the needle in north America, and the oceans on either ſide. In like manner he accounts for the variations in the ſouthern hemiſphere. See Philoſ. Tranſ. n° 148.

The variation of the needle from the north and ſouth points of the horizon, not being the ſame, but variable in different years, and in a diverſe manner in different parts of the earth, made the doctor farther conjecture, that two of the magnetic poles were fixed, and two moveable; and in order to make this out, he ſuppoſes the external part of the earth to be a ſhell or cortex, containing within it a magnetic moveable nucleus of a globular form, whoſe center of gravity is the ſame with that of the earth, and moveable about the ſame axis.

Now, if the motions of both the ſhell and nucleus were the ſame, the poles of each would always have the ſame poſition to each other; but he ſuppoſes the motion of the nucleus to be a very ſmall matter leſs than that of the ſhell, which yet is ſcarce ſenſible in 365 revolutions; and, if ſo, the magnetic poles of the nucleus will by ſlow degrees change their diſtance from the magnetic poles of the ſhell, and thus cauſe a variation in that needle's variation, which is governed by the moveable pole of the nucleus, while that variation which reſpects the fixed poles of the magnetic ſhell remains more conſtant; as in Hudſon's-bay the change is not obſerved to be near ſo faſt as in theſe parts of Europe.

What ſeems a little ſtrange is, that the doctor has no where undertook to account for the dipping of the needle by this hypotheſis; though the invention of this (by Mr. Blagrave) was before that of the change of the needle's variation (by Mr. Gellibrand); nor does it appear which way this phænomenon is explicable by it. But we have not yet ſo many

many accurate obſervations of the needle's inclination as we have of its variation, which is its only uſual property. By ſeveral experiments Mr. Graham has very accurately made, it appears, that the quantity of the needle's inclination to the horizontal line, was an angle of about 74 or 75 degrees: that is, ſuppoſe A B (plate CCXCII. fig. 1. n° 1.) a touched needle ſupported on the point C, of the pin C D, it will remain an angle A C H, or B C O, with the horizontal line H O of 74 or 75 degrees.

The variation of the needle has within a century paſt undergone a remarkable alteration; for at London it was obſerved by Mr. Burrows, in the year 1580, to be 11° 15′ eaſt; that is, if N. S. (*ibid.* n° 2.) repreſent the north and ſouth points of the horizon, and E. W. the eaſt and weſt points, the needle then had the ſituation A B, ſo that the arch B N = 11° 15′. After that, in the year 1622, it was obſerved by Mr. Gunter to be but 6° eaſt. In the year 1634, Mr. Gellibrand obſerved it to be 4° 5′ eaſt. In 1657, it was obſerved by Mr. Bond to be nothing at all, that is, the needle placed itſelf in the ſituation S. N. and pointed directly to the north. After this, in the year 1672, Dr. Halley obſerved it to be 2° 30′ weſtward; and again, in the year 1692, he found it 6° weſt. Since then, in the year 1722, Mr. Graham, by moſt accurate experiments, found it to be 14° 13′, and at preſent it is between 15° and 16°; and in ſome places it is found 18° weſtward.

The variation of the declination and inclination of the needle is variable, and ſubject to no regular computation. What the quantity of both ſorts of variation is in the ſeveral parts of the world, is ſhewn in Dr. Halley's map of the world, improved from the obſervations of Mr. Pound.

If the ſun's true amplitude or azimuth, found by calculation, agree with the magnetic amplitude or azimuth, found by obſervation, it is evident there is no variation: but if they diſagree, and the true and obſerved amplitudes, at the riſing or ſetting of the ſun, be both of the ſame name; that is, either both north, or both ſouth, their difference is the variation. whereas, if they be of different names, *i. e.* one north and the other ſouth, their ſum is the variation. Again, if the true and obſerved azimuths be both of the ſame name, *i. e.* both eaſt or both weſt, their difference is the variation; but if they be of different names, their ſum is the variation: and to know whether the variation be eaſterly or weſterly, obſerve the following general rule; let the obſerver's face be turned towards the ſun, then if the true amplitude or azimuth be to the right-hand, the variation is eaſterly; but if to the left, weſterly. To illuſtrate this, let N E S W. (*ibid.* n° 3.) repreſent a compaſs; and ſuppoſe the ſun is really E b S at the time of obſervation, but the obſerver ſees him off the eaſt point of the compaſs, and ſo the true amplitude or azimuth of the ſun is to the right of the magnetic, or obſerved: here it is evident, that the E b S point of the compaſs ought to lie where the eaſt point is, and ſo the north where the N b W is; conſequently the north point of the compaſs is a point too far eaſt, *i. e.* the variation in this caſe is eaſterly. The ſame will hold when the amplitude or azimuth is taken on the weſt ſide of the meridian.

Again, let the true amplitude or azimuth be to the left-hand of the obſerved; thus ſuppoſe the ſun is really E b N at the time of obſervation, but the obſerver ſees him off the eaſt point of the compaſs, and ſo the true amplitude or azimuth to the left of the obſerved: here it is evident, that the E b N point of the compaſs ought to ſtand where the eaſt point is, and ſo the north where the N b E point is; conſequently the north point of the compaſſes lies a point too far weſterly, ſo in this caſe the variation is weſt. The ſame will hold when the ſun is obſerved on the weſt ſide of the meridian.

Suppoſe the ſun's true amplitude at riſing is found to be E. 14°, 20′ N. but by the compaſs it is found to be E. 26°, 12′ N. Required the variation, and which way it is.

Since they are both the ſame way, therefore,

From the magnetic ampl. E. 26°, 12′ N.
take the true amplitude - E. 14°, 20′ N.
and there remains the varia. 11, 52 E.

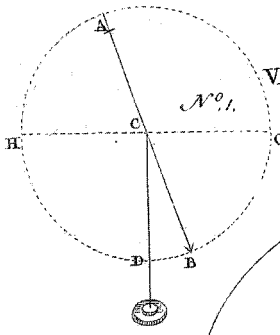
which is eaſterly, becauſe in this caſe the true amplitude is to the right of the obſerved.

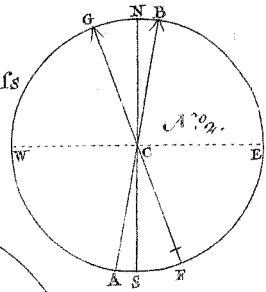
VARIATION *of the moon*, in aſtronomy, is the third inequality obſerved in that planet's motion. See the article MOON.

VARIEGATION,

Fig. 1.

VARIATION of the Compass





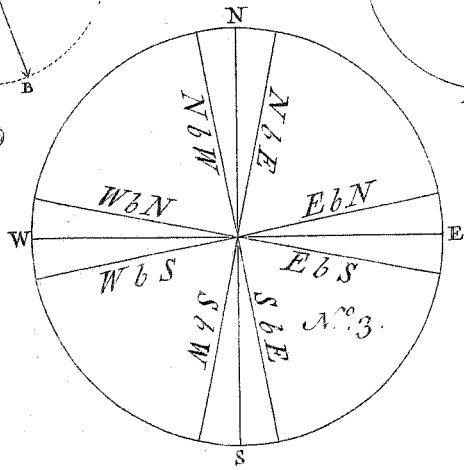
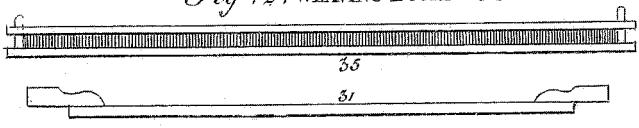
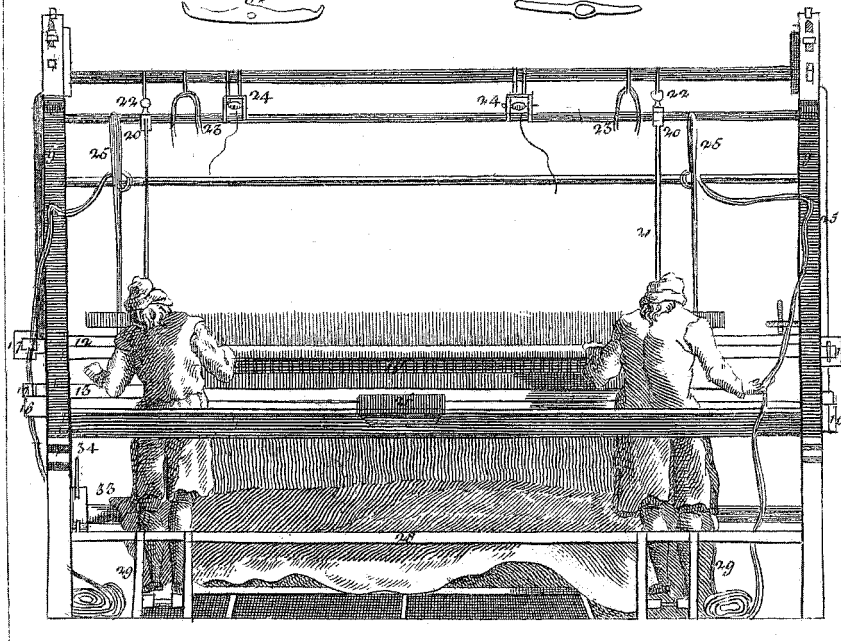


Fig. 2. WEAVING-Loom &c





I. Jefferys sculp

VARIEGATION, among botaniſts and floriſts, the act of ſtreaking or diverſifying the leaves, *&c.* of plants and flowers with ſeveral colours.

Variegation is either natural or artificial.

Of natural variegation there are four kinds; the firſt ſhewing itſelf in yellow ſpots here and there, in the leaves of plants called, by gardeners, the yellow bloach. The ſecond kind, called the white bloach, marks the leaves with a great number of white ſpots, or ſtripes; the whiteſt lying next the ſurface of the leaves, uſually accompanied with other marks of a greeniſh white, that lie deeper in the body of the leaves. The third, and moſt beautiful, is where the leaves are edged with white, being owing to ſome diſorder or infection in the juices, which ſtains the natural complexion or verdure of the plant. The fourth kind is that called the yellow edge.

Artificial variegation is performed by inarching or inoculating a ſtriped or variegated plant into a plain one of the ſame ſort; as a variegated common jeſſamin into a plain, common, ſpaniſh, brazil, or indian jeſſamin.

A ſingle bud or eye, Mr. Bradley obſerves, being placed in the eſcutcheon of a diſtempered tree, where it can only receive nouriſhment from the vitiated juices, will become variegated proportionably to the nouriſhment it draws, and will partake more of the white and yellow juice, than if a branch ſhould be inarched, the bud having nothing to nouriſh it but the juices of the plant it is inoculated on; whereas a cyon inarched is fed by the ſtriped plant, and the healthful one.

As to the natural ſtripes or variegations, there are ſome particular circumſtances to be obſerved: 1. That ſome plants only appear variegated or bloached in the ſpring and autumn, the ſtains diſappearing as they gather ſtrength: of this kind are rue, thyme, and marjoram. 2. Some plants are continually bloached in the ſpongy part of their leaves: the ſap-veſſels, all the time, remaining of a healthful green: ſuch are the alternus, orange-mint, *&c.* which, being ſtrengthened by rich manure, or being inarched in healthful plants, throw off the diſtemper. 3. In other plants, the diſeaſe is ſo rooted and inveterate, that it is propagated with the ſeed: ſuch are the archangel, water-betony, bank creſs, borrage, ſtriped cellary, and ſycamore; the ſides of which produce ſtriped plants.

VARIOLÆ, the SMALL-POX, in medicine. See the article POX.

VARIORUM, or *cum notis* VARIORUM, in matters of literature, denotes an edition of a claſſic author, with notes of divers authors thereupon: theſe editions are generally moſt valued.

VARIX, in medicine, the dilatation of a vein, ariſing from the too great abundance or thickneſs of the blood; the cure of which is to be attempted by evacuations, as phlebotomy and cathartics; as alſo by external applications, as diſcutient fomentations, cataplaſms, embrocations, *&c.* or, where the caſe grows dangerous, by inciſion.

VARNA, a town of Bulgaria, in european Turky, ſituated on the weſtern coaſt of the Black-ſea, an hundred and twenty miles north of Conſtantinople.

VARNISH, or VERNISH, a thick, viſcid, ſhining liquor, uſed by painters, gilders, and various other artificers, to give a gloſs and luſtre to their works; as alſo to defend them from the weather, duſt, *&c.*

There are ſeveral kinds of varniſhes in uſe; as the ſiccative or drying varniſh, made of oil of aſpin, turpentine, and ſandarach melted together. White varniſh, called alſo venetian varniſh, made of oil of turpentine, fine turpentine, and maſtic. Spirit of wine varniſh, made of ſandarach, white amber, gum elemi, and maſtic; ſerving to gild leather, picture-frames, *&c.* withal. Alſo the gilt-varniſh, china-varniſh, common varniſh, *&c.*

1. To make the white varniſh: take gum ſandarach, of the cleareſt and whiteſt ſort, eight ounces; gum maſtic, of the cleareſt ſort, half an ounce; of ſarcocolla, the whiteſt, three quarters of an ounce; venice turpentine, an ounce and a half; benzoin, the cleareſt, one quarter of an ounce; white roſin, one quarter of an ounce; gum animæ, three quarters of an ounce: let all theſe be diſſolved, and mixed in the manner following:

Put the ſarcocolla and roſin into a little more ſpirits than will cover them to diſſolve; then add the benzoin, gum animæ, and venice turpentine, into either a glaſs or glazed earthen veſſel, and pour on as much ſpirits as will cover them an inch; then put the gum maſtic into a glaſs or glazed veſſel, and pour ſtrong ſpirits upon it, covering it alſo about an inch thick, to diſſolve it rightly; then put your gum elemi in a diſtinct veſſel

as

as before, and cover it with ſpirits to diſſolve.

For this purpoſe, you need only break the roſin a little, and powder the gum animæ, ſarcocolla, and benzoin.

Let all ſtand three or four days to diſſolve, ſhaking the glaſſes, *&c.* two or three times a day, and afterwards put them all together into a glazed veſſel, ſtirring them well, and ſtrain the liquor and gums gently, beginning with the gums, through a linnen cloth.

Then put it into a bottle, and let it ſtand a week before you uſe it, and pour off as much of the clear only, as you think ſufficient for preſent uſe.

2. The white amber-varniſh is thus made, according to Mr. Boyle: take white roſin four drams, melt it over the fire in a clean glazed pipkin; then put into it two ounces of the whiteſt amber you can get, finely powdered. This is to be put in by a little and a little, gradually, keeping it ſtirring all the while with a ſmall ſtick, over a gentle fire, till it diſſolves, pouring in now and then a little oil of turpentine, as you find it growing ſtiff; and continue ſo to do till all your amber is melted.

But great care muſt be taken not to ſet the houſe on fire, for the very vapours of the oil of turpentine will take fire by heat only; but if it ſhould happen ſo to do, immediately put a flat board or wet blanket over the fiery pot, and by keeping the air from it, you will put it out, or ſuffocate it.

Therefore it will be beſt to melt the roſin, in a glaſs of a cylindric figure, in a bed of hot ſand, after the glaſs has been well annealed, or warmed by degrees in the ſand, under which you muſt keep a gentle fire.

When the varniſh has been thus made, pour it into a coarſe linnen-bag, and preſs it between two hot boards of oak or flat plates of iron; after which it may be uſed with any colours in painting, and alſo for varniſhing them over when painted.

But for covering gold, you muſt uſe the following varniſh: mean time, it is to be obſerved, that when you have varniſhed with white varniſh, you may put the things varniſhed into a declining oven, which will harden the varniſh.

3. A hard varniſh, that will bear the muffle, may be thus made: take of colophony, an ounce; ſet it over the fire in a well-glazed earthen veſſel, till it is melted; then by little and little, ſtrew in two ounces of powder of amber, keeping it ſtirring all the while with a ſtick; and when you perceive it begin to harden or reſiſt the ſtick, then put in a little turpentine oil, which will thin and ſoften it immediately; then put in two ounces of gum copal, finely powdered, ſprinkling it in as you did the amber, now and then pouring in a little oil of turpentine; and when it is done, ſtrain it as before directed.

This is proper to varniſh over gold; and the things done with it muſt be ſet into a declining oven, three or four days ſucceſſively, and then it will reſiſt even the fire itſelf.

4. To make a varniſh for braſs, that will cauſe it to look like gold. Take two quarts of ſpirit of wine, and put it into a retort glaſs; then add to it an ounce of gamboge, two ounces of lacca, and two ounces of maſtic; ſet this in a ſand-heat for ſix days, or elſe near a fire, or you may put the body of the bolt-head frequently into warm water, and ſhake it two or three times a-day; then ſet it over a pan of warm ſaw-duſt. But before this varniſh is laid over the metal, let it be well cleaned.

This is a good varniſh to mix with any colours that incline to red, and the amber-varniſh for mixing with thoſe that are pale.

5. To make a varniſh for gold, or metals made in imitation of gold. Take colophony, and, having melted it, put in two ounces of amber finely powdered, and ſome ſpirit of turpentine, and, as the amber thickens, keep it well ſtirring; then put in an ounce of gum elemi, well pulverized, and more ſpirit of turpentine; conſtantly ſtirring the liquor till all is well mixed and incorporated: but take care, however, to uſe as little turpentine as you can, becauſe, the thicker the varniſh is made, the harder it will be. Let this be done over a ſand-heat, in an open glaſs; then ſtrain it, as is directed for the preceding varniſh. This varniſh is to be uſed alone, firſt warming the veſſels made of paper-paſte; and lay it on with a painting-bruſh before the fire, but not too near, leaſt the fire raiſe it into liſters. After this has been done, harden it three ſeveral times in ovens; firſt with a ſlack heat, the next with a warmer, and the third with a very hot one; and the veſſels will look like poliſhed gold.

And

And as for ſuch veſſels, *&c.* as ſhall be made with ſaw-duſt and gums, the varniſh may be made of the ſame ingredients as above-mentioned, except the gum-elemi; and this will dry in the ſun, or in a gentle warmth.

6. To make a varniſh for any thing covered with leaf-ſilver. Firſt paint the thing over with ſize, and ground chalk or whiting; let them ſtand till they are thoroughly dry, and then do them over with very good gold-ſize, of a bright colour (for there is much difference in the colour of it; ſome being yellow, and others almoſt white; the firſt is moſt proper for gold, and the laſt for ſilver). When this ſize is ſo dry as that it will juſt ſtick a little to the touch, lay on the leaf ſilver, and cloſe it well to the ſize.

7. To make a varniſh for ſilver. Melt, in a well glazed pipkin, ſome fine turpentine, and put in three ounces of white amber, finely powdered (more or leſs, according to the quantity your work will require) put it in by little and little, keeping it continually ſtirring, adding by degrees ſome ſpirit of turpentine, till all the amber is diſſolved; and then add to it an ounce of ſarcocolla well beaten, and an ounce of gum elemi well levigated, adding now and then a little ſpirit of turpentine, till all is diſſolved: do this over a gentle fire, and keep it conſtantly ſtirring.

This varniſh will be as white and ſtrong as the former; and is to be uſed warm, and hardened by degrees in an oven, as varniſhed gold, whereby it will look like poliſhed ſilver.

Laying on of VARNISHES. 1. If you varniſh wood, let your wood be very ſmooth, cloſe-grained, free from greaſe, and rubbed with ruſhes. 2. Lay on your colours as ſmooth as poſſible; and, if the varniſh has any bliſters in it, take them off by a poliſh with ruſhes. 3. While you are varniſhing, keep your work warm, but not too hot. 4. In laying on your varniſh, begin in the middle, and ſtroke the bruſh to the outſide; then to another extreme part, and ſo on till all be covered; for if you begin at the edges, the bruſh will leave blots there, and make the work unequal. 5. In fine works uſe the fineſt tripoli in poliſhing: do not poliſh it at one time only; but, after the firſt time, let it dry for two or three days, and poliſh it again for the laſt time. 6. In the firſt poliſhing you muſt uſe a good deal of tripoli, but in the next a very little will ſerve: when you have done, waſh off your tripoli with a ſponge and water: dry the varniſh with a dry linen-rag; and clear the work, if a white ground, with oil and whiting; or, if black, with oil and lamp-black.

VARNISH alſo ſignifies a ſort of ſhining coat, wherewith potter's ware, delft-ware, china-ware, *&c.* are covered, which gives them a ſmoothneſs and luſtre. Melted lead is generally uſed for the firſt, and ſmalt for the ſecond. See the article GLAZING.

VARNISH, among medaliſts, ſignifies the colours antique medals have acquired in the earth.

The beauty which nature alone is able to give to medals, and art has never yet attained to counterfeit, enhances the value of them; that is, the colour, which certain ſoils, in which they have a long time lain, tinges the metals withal; ſome of which are blue, almoſt as beautiful as the turquoiſe; others with an inimitable vermilion colour; others with a certain ſhining poliſhed brown, vaſtly finer than braſil figures.

The moſt uſual varniſh is a beautiful green, which hangs to the fineſt ſtrokes without effacing them, more accurately than the fineſt enamel does on metals.

No metal but braſs is ſuſceptible of this; for the green ruſt that gathers on ſilver always ſpoils it, and it muſt be got off with vinegar or lemon-juice.

Falſifiers of medals have a falſe or modern varniſh, which they uſe on their counterfeits, to give them the appearance, or air, of being antique. But this may be diſcovered by its ſoftneſs, it being ſofter than the natural varniſh, which is as hard as the metal itſelf.

Some depoſite their ſpurious metals in the earth for a conſiderable time, by which means they contract a ſort of varniſh, which may impoſe upon the leſs knowing; others uſe ſal armoniac, and others burnt paper.

VAS, a veſſel either for mechanical, chemical, culinary, or any other uſes. In anatomy, all the parts which convey a fluid are called veſſels, as the veins, arteries, and lymphatics.

VASA CONCORDIÆ, among hydraulic authors, are two veſſels, ſo conſtructed as that one of them, though full of wine, will not run a drop; unleſs the other, being full of water, do run alſo. Their ſtructure and apparatus may be ſeen in Wolfius Element. Mathef. T. I. Hydraul.

VASCULAR, in anatomy, ſomething conſiſting of divers veſſels; as arteries, veins, nerves, *&c.* See ARTERY, *&c.*

VASCULIFEROUS PLANTS, ſuch whoſe ſeeds are contained in veſſels, which are ſometimes divided into cells.

VASE, a term frequently uſed for antient veſſels dug from under ground, or otherwiſe found, and preſerved in the cabinets of the curious.

In architecture, the appellation vaſe is alſo given to thoſe ornaments placed on corniches, ſocles, or pedeſtals, repreſenting the veſſels of the antients, particularly thoſe uſed in ſacrifice; as incenſe-pots, flower-pots, *&c.* They ſerve to crown or finiſh facades, or frontiſpieces; and hence called acroteria.

The term vaſe, however, is more particularly uſed, in architecture, to ſignify the body of the corinthian and compoſite capital; otherwiſe called the tambour or drum, and ſometimes the campana or bell. See the articles CORINTHIAN and COMPOSITE.

Vaſe is ſometimes alſo uſed, among floriſts, for what is more uſually called the calyx, or cup. See CALYX.

VASSAL, in old law-books, denotes a tenant that held land in fee of his lord, to whom he vowed fidelity and ſervice. See the articles FEALTY, FEE, HOMAGE, *&c.*

VASSERBURG, or WASSERBURG, a town of Bavaria, in Germany, ſituated on the the river Inn, thirty miles eaſt of Munich.

VASTO, in law, a writ that lies for the heir, or him in reverſion or remainder, againſt the tenant for term of life or years, for making waſte. See the article WASTE.

VASTUS, in anatomy, the name of two of the extenſor muſcles of the legs; the one, called vaſtus internus, ariſes from the whole internal ſide of the femur; and the other, called vaſtus externus, takes its riſe from the whole external ſide of femur; and both together, with the cruralis and rectus, form a very robuſt and ſtrong tendon juſt above the knee, to which the patella adheres behind, and which is inſerted below the knee at a tubercle of the tibia. See MUSCLE.

VAT, or FAT, a veſſel for holding wine, ale, beer, cyder, *&c.* in the time of their preparation.

VATERIA, in botany, a genus of the *polyandria-monogynia* claſs of plants, the flower of which conſiſts of five oval and patent petals; and its fruit is a turbinated, coriaceous, and unilocular capſule, containing a ſingle oval ſeed.

VATICAN, a magnificent palace of the pope, in Rome, which is ſaid to conſiſt of ſeveral thouſand rooms: but the parts of it moſt admired are the grand ſtair-caſe, the pope's apartment, and eſpecially the library, which is one of the richeſt in the world, both in printed books and manuſcripts.

VAUDEMONT, the capital of a county of the ſame name in Lorrain, fifteen miles ſouth-weſt of Nancy.

VAUDOIS are certain valleys ſituated north of the marquiſate of Saluzzo, in Italy: the chief town is Lucern. See the article LUCERN.

VAUDREVANGE, a town of Lorrain, ſituated on the river Sare, fifty miles north-eaſt of Nancy.

VAUGE, high mountains of Alſace, in Germany, which ſeparate it from Lorrain on the weſt.

VAULT, *fornix*, in architecture, an arched roof, ſo contrived that the ſtones which form it ſuſtain each other. See ARCH.

Vaults are, on many occaſions, to be preferred to ſoffits or flat ceilings, as they give a greater height and elevation, and are beſides more firm and durable. See CEILING.

Salmaſius obſerves, that the antients had only three kinds of vaults. The firſt was the fornix, made cradle-wiſe; the ſecond a teſtudo, *i. e.* tortoiſe-wiſe, which the French call cul de four, or oven-wiſe; and the third concha, or trumpet-wiſe. But the moderns have ſubdivided theſe three ſorts into many more, to which they have given different names, according to their figures and uſes; ſome of them are circular, and others elliptical. Again, the ſweeps of ſome are larger, others leſs, portions of a ſphere. All ſuch as are above hemiſpheres are called high, or ſurmounted, vaults; and all that are leſs than hemiſpheres, are called low, or ſurbaſed, vaults, or teſtudines. In ſome vaults the height is greater than the diameter; in others it is leſs: others, again, are quite flat, and only made with haunſes; others like ovens, or in the form of a cul de four, *&c.* and others growing wider as they lengthen, like a trumpet.

There are alſo gothic vaults, with ogives, *&c.* See OGIVE, *&c.*

Of vaults ſome again are ſingle, others double, croſs, diagonal, horizontal, aſcending,

aſcending, deſcending, angular, oblique, pendent, &c.

Maſter VAULTS are thoſe that cover the principal parts of buildings, in contradiſtinction to the upper or ſubordinate vaults, which only cover ſome little part, as a paſſage or gate, &c.

Double VAULT is one that is built over another, to make the outer decoration range with the inner; or, to make the beauty and decoration of the inſide conſiſtent with that of the outſide, leaves a ſpace between the concavity of the one and the convexity of the other. Inſtances of which we have in the dome of St. Peter's at Rome, St. Paul's at London, and in that of the invalids at Paris.

VAULTS *with compartments* are ſuch whoſe ſweep, or inner face, is enriched with pannels of ſculpture, ſeparated by platbands. Theſe compartments, which are of different figures, according to the vaults, and uſually gilt on a white ground, are made with ſtone or brick-walls, as in the church of St. Peter at Rome, or with plaiſter on timber vaults.

Theory of VAULTS. A ſemi-circular arch or vault, ſtanding on two piedroits, or impoſts, and all the ſtones that compoſe them, being cut, and placed in ſuch manner as that their joints or beds, being prolonged, do all meet in the center of the vault; it is evident that all the ſtones muſt be in the form of wedges; *i.e.* muſt be wider and bigger at top: by virtue of which they ſuſtain each other, and mutually oppoſe the effort of their weight, which determines them to fall.

The ſtone in the middle of the vaults, which ſtands perpendicular to the horizon, and is called the key of the vault, is ſuſtained on each ſide by two contiguous ſtones, juſt as by two inclined planes; and, conſequently, the effort it makes to fall is not equal to its weight.

But ſtill that effort is the greater, as the inclined planes are leſs inclined; ſo that if they were infinitely little inclined, *i. e.* if they were perpendicular to the horizon as well as the key, it will tend to fall with its whole weight, and would actually fall but for the mortar.

The ſecond ſtone, which is on the right or left of the key-ſtone, is ſuſtained by a third, which, by virtue of the figure of the vault, is neceſſarily more inclined to the ſecond than the ſecond is to the firſt; and conſequently the ſecond, in the effort it makes to fall, employs a leſs part of its weight than the firſt. For the ſame reaſon, the ſtones from the key-ſtone employ ſtill a leſs and leſs part of their weight to the laſt, which, reſting on a horizontal plane, employs no part of its weight; or, which is the ſame thing, makes no effort at all, as being entirely ſupported by the impoſt.

Now, in vaults, a great point to be aimed at is, that all the vouſſoirs, or key-ſtones, make an equal effort towards falling. To effect this, it is viſible, that as each (reckoning from the key to the impoſt) employs ſtill a leſs and leſs part of its whole weight; the firſt, for inſtance, only employing one half; the ſecond, one third; the third, one fourth, &c. There is no other way of making thoſe different parts equal, but by a proportionable augmentation of the whole; *i. e.* the ſecond ſtone muſt be heavier than the firſt, the third than the ſecond, &c. to the laſt; which ſhould be infinitely heavier.

M. de la Hire demonſtrates what that proportion is, in which the weights of the ſtones of a ſemi circular arch muſt be increaſed to be in æquilibrio, or to tend with equal forces to fall, which is the firmeſt diſpoſition a vault can have.

The architects before him had no certain rule to conduct themſelves by, but did all at random. Reckoning the degrees of the quadrant of a circle, from the key-ſtone to the impoſt, the extremity of each ſtone will take up ſo much the greater arch as it is farther from the key.

M. de la Hire's rule is to augment the weight of each ſtone above that of the key-ſtone, as much as the tangent of the arch of the ſtone exceeds the tangent of the arch of half the key. Now the tangent of the laſt ſtone of neceſſity becomes infinite, and of conſequence its weight ſhould be ſo too; but, as infinity has no place in practice, the rule amounts to this, that the laſt ſtones be loaded as much as poſſible, that they may the better reſiſt the effort which the vault makes to ſeparate them; which is called the ſhoot or drift of the vault.

Mr. Parent has ſince determined the curve, or figure, which the extrados, or outſide of a vault, whoſe intrados, or inſide, is ſpherical, muſt have, that all the ſtones may be in æquilibrio.

Key of a VAULT is a ſtone or brick in the middle of the vault, in form of a truncated cone, ſerving to bind or faſten all the reſt. See KEY.

Reins, or fillings up of a VAULT are the ſides which ſuſtain it. See REINS.

Pendentive of a VAULT is the part ſuſpended between the arches or ogives. See PENDENTIVE.

Impoſt of a VAULT is the ſtone whereon the firſt vouſſoir, or arch-ſtone of the vault, is laid. See IMPOST.

VAUR, a town of Languedoc, in France, eighteen miles weſt of Toulouſe.

UBEDA, a city of Andaluſia, in Spain, forty-five miles north-eaſt of Granada. weſt long. 3° 6′, north lat. 38°.

UBERLINGEN, a town of Swabia, in Germany, ten miles north of Conſtance.

UBES, or ST. UBES, a city and port-town of Portugal, ſituated on a fine bay, twenty-one miles ſouth of Liſbon.

UBIQUITARIANS, in church-hiſtory, a ſect of heretics who ſprung up in Germany about the year 1590, and maintained that the body of Jeſus Chriſt is *ubique*, everywhere, or in every place, at the ſame time. However, they were not quite agreed among themſelves; ſome holding, that the body of Jeſus Chriſt, even during his mortal life, was every where; and others dating the ubiquity of his body from the time of his aſcenſion only.

UBIQUITY, omnipreſence; an attribute of the Deity, whereby he is always intimately preſent to all things; gives the eſſe to all things; knows, preſerves, and does all in all things. See GOD.

For, ſince God cannot be ſaid to exiſt in all places, as placed therein (becauſe then he would need ſomething to his exiſtence, *viz.* place; and would have extenſion, parts, *&c.*) he muſt be conceived to be everywhere, or in all things, as a firſt, univerſal, efficient cauſe, in all his effects. See CAUSE, *&c.*

He is preſent therefore to all his creatures, as a pure act or an exerciſe of an active virtue, which knows, preſerves, governs, *&c.* every thing. Nor are even finite minds preſent, otherwiſe than by operation.

UCKERMUND, a town of upper Saxony, and dutchy of Pomerania, ſituated on a bay of the Baltic-Sea, twenty-five miles north weſt of Stetin.

UDDER, *uber*, in comparative anatomy, that part in brutes wherein the milk is prepared, anſwering to the mammæ, or breaſts, in women. See BREASTS.

UDENSKOI, a town of Siberia, ſituated in eaſt long. 96° 30′, north lat. 53°.

UDINA, a town of Friuli, in Italy, twenty-five miles north of Aquileia.

VECHT, a town of Weſtphalia, in Germany, thirty miles north of Oſnabrug.

VECHT is alſo a river in the united Netherlands; which running from eaſt to weſt through the province of Overyſſel, falls into the Zuyder-ſea below Swartſluys.

VECTIS, the LEVER, one of the mechanic powers. See LEVER.

VECTOR, in aſtronomy, a line ſuppoſed to be drawn from any planet moving round a center, or the focus of an ellipſis, to that center or focus.

This, by ſome writers of the new aſtronomy, is called vector, or radius vector, becauſe it is that line by which the planet ſeems to be carried round its center, and with which it deſcribes areas proportional to the times. See the articles PLANET, AREA, *&c.*

VEDETTE, in the military art, a ſentinel on horſeback detached from the main body of the army, to diſcover and give notice of the enemies deſigns.

VEER, a ſea-term variouſly uſed. Thus veering out a rope, denotes the letting it go by hand, or letting it run out of itſelf. It is not uſed for letting out any running rope except the ſheat.

VEER is alſo uſed in reference to the wind; for, when it changes often, they ſay it veers about.

VEGETABLE, *vegetabile*, in phyſiology, a term applied to all plants, conſidered as capable of growth: *i. e.* all natural bodies which have parts organically formed for generation and accretion, but not ſenſation. See PLANT.

VEGETATION, in phyſiology, the act whereby plants receive nouriſhment and grow. See PLANT.

The proceſs of nature, in the vegetation of plants, is very accurately delivered by the excellent Malpighi, to the effect following: The egg, or ſeed, of the plant being excluded out of the ovary, called pod, or huſk, and requiring further foſtering and brooding, is committed to the earth; which having received it into her fertile boſom, not only does the office of incubation, by her own warm vapours and exhalation, joined with the heat of the ſun; but, by degrees, ſupplies what the ſeed requires for its further growth: as abounding everywhere with canals and ſinuſes, wherein the dew and rain-water, impregnated with fertile ſalts, glide, like the chyle and blood in the arteries, *&c.* of animals. This moiſture, meeting with a new depoſited ſeed, is percolated, or ſtrained through the pores or

pipes

pipes of the outer rind, or huſk, correſponding to the ſecundines of the fœtuſes, on the inſide whereof lies one or more, commonly two, thick ſeminal leaves, anſwering to the placenta in women, and the cotyledons in brutes. See EGG, SEED, *&c.*

Theſe ſeed-leaves conſiſt of a great number of little veſiculæ, or bladders, with a tube coreſponding to the navel-ſtring in animals. In theſe veſiculæ is received the moiſture of the earth, ſtrained thro' the rind of the ſeed; which makes a ſlight fermentation with the proper juice before contained therein. This fermented liquor is conveyed by the umbilical veſſel to the trunk of the little plant; and to the gem, or bud, which is contiguous thereto: upon which a vegetation and increaſe of the parts ſucceed.

Such is the procedure in the vegetation of plants; which the illuſtrious author exemplifies in a grain of wheat, as follows: The firſt day the grain is ſown it grows a little turgid; and the ſecundine, or huſk, gapes a little in ſeveral places: and the body of the plant, being continued by the umbilical veſſel to a conglobated leaf (which is called the pulp or fleſh of the ſeed, and is what conſtitutes the flower) ſwells; by which means, not only the gem or ſprout (which is to be the future ſtem) opens, and waxes green, but the roots begin to bunch out; whence the placenta, or ſeed-leaf, becoming looſe, gapes. The ſecond day, the ſecundine, or huſk, being broke through, the ſtem, or top of the future ſtraw, appears on the outſide thereof, and grows upwards by degrees: in the mean time, the ſeed-leaf, guarding the roots, becomes turgid with its veſiculæ, and puts forth a white down. And the leaf being pulled away, you ſee the roots of the plant bare; the future buds, leaves, and reſt of the ſtalk lying hid. Between the roots and the aſcending ſtem the trunk of the plant is knit, by the navel-knot, to the flower-leaf, which is very moiſt, though it ſtill retains its white colour and its natural taſte. The third day, the pulp of the conglobated, or round leaf, becomes turgid with the juice which it received from the earth fermenting with its own.

Thus the plant increaſing in bigneſs, and its bud or ſtem becoming taller, from whitiſh turns greeniſh: the lateral roots alſo break forth greeniſh and pyramidal from the gaping ſheath, which adheres chiefly to the plant; and the lower root grows longer and hairy, with many fibres ſhooting out of the ſame.

Indeed there are hairy fibres hanging all along on all the roots, except on their tips; and theſe fibres are ſeen to wind about the ſaline particles of the ſoil, little lumps of earth, *&c.* like ivy; whence they grow curled. Above the lateral roots there now break out two other little ones.

The fourth day, the ſtem, mounting upwards, makes a right angle with the ſeminal leaf: the laſt roots put forth more; and the other three, growing larger, are cloathed with more hairs, which ſtraitly embrace the lumps of earth; and where they meet with any vacuity, unite into a kind of net-work.

From this time forward the root puſhes with more regularity downward, and the ſtalk upward, than before. There is, however, this great difference in their growth, that the ſtalk and branches find no reſiſtance to their ſhooting up, while the roots find a great deal to their ſhooting downward, by means of the ſolidity of the earth, whence the branches advance much faſter and farther in their growth than the roots; and theſe laſt, often finding the reſiſtance of a tough earth unſurmountable, turn their courſe, and ſhoot almoſt horizontally. See GENERATION.

VEGETATIVE SOUL, among philoſophers, denotes that principle in plants, by virtue of which they vegetate, or receive nouriſhment and grow. See the preceding article.

VEHICLE, *vehiculum*, in general, denotes any thing that carries or bears another along; but is more particularly uſed in pharmacy for any liquid ſerving to dilute ſome medicine, in order that it may be adminiſtered more commodiouſly to the patient.

VEIL, *velum*, a piece of ſtuff, ſerving to cover or hide any thing.

In the romiſh churches, in time of Lent, they have veils or curtains over the altar, crucifix, images of ſaints, *&c.*

A veil of crape is wore on the head by nuns, as a badge of their profeſſion: the novices wear white veils; but thoſe who have made the vows, black ones. See the article NUN.

VEIN, *vena*, in anatomy, is a veſſel which carries the blood from the ſeveral parts of the body to the heart. The veins are compoſed principally of a membranaceous,

branaceous, a vaſculous, and a muſculous tunic: but theſe are vaſtly thinner than in the arteries. See ARTERY.

The veins are only a continuation of the extreme capillary arteries, reflected back again towards the heart, and uniting their channels as they approach it, till at laſt they all form three large and primary veins, *viz.* the cava, which brings the blood back from all parts above and below the heart; the vena portæ, which brings the blood from the liver; and the pulmonary vein. See CAVA, *&c.*

The beſt method of tracing the general courſe of the veins, is to begin with the main trunks, or primary veins, and end with their ramifications and capillary extremities, according to their ſeveral diviſions and ſubdiviſions.

The vena cava ariſes, with a large ſinus, from the right auricle of the heart; ſee plate CCXCIII. fig. 1. and 2. where it is marked 1: and here it ſends out a vein to the heart itſelf, called the coronary vein; and is divided into two trunks, a ſuperior called the cava deſcendens, and marked 2; and an inferior one, called cava aſcendens, and marked 3. From the ſuperior trunk of the vena cava, ariſe the following veins, *viz.* the vena azygos, marked 4; the bronchial vein, which, in ſome ſubjects, indeed, does not riſe ſeparate, but comes from the azygos, and ſometimes from the intercoſtals, and in ſome is altogether wanting; the mediaſtinal vein, which accompanies the mediaſtinal artery; the ſuperior diaphragmatic, which in like manner accompanies the artery of that name; and finally, the ſubclavians, marked 5, 5. From theſe laſt ariſe, on each ſide, the external jugular vein, marked 6, 6, where the right one, in fig. 1. is cut off: the jugular vein in its ſubdiviſions receives different denominations from the parts over which they are diſtributed; as the frontal, temporal, occipital, *&c.* From the ſubclavians likewiſe ariſe the internal jugulars, marked 7, 7: theſe give ramifications to the larynx, pharynx, the muſcles of the os hyoides, and to the tongue: and beſides theſe, its trunk terminates in a ſack, and brings back the blood from the brain and ſinuſes of the dura mater. From the ſame veins likewiſe ariſe the vertebral one, which aſcends to the cranium thro' the tranſverſe apophyſes of the vertebræ of the neck; alſo the intercoſtals, marked 8 (fig. 2.) the mammary veins, marked 9, 9, *ibid.* the ſcapulares and muſculares: and, finally, the axillary veins, marked 10, 10, the exterior branch of which is called the cephalic, marked 11, 11, (fig. 1. and 2.) and extended along the exterior part of the arm towards the thumb; its interior branch, called the baſilic, and marked 12, 12; the vena mediana, formed of the concourſe of the hepatic and baſilic, and marked 13, 13; and finally, that which runs over the back of the hand towards the little finger, is called the ſalvatella. See AZYGOS, *&c.*

The inferior trunk of the vena cava is remarkable for its valves, which ſerve to prevent the blood from returning towards the extremities: it is marked 3.

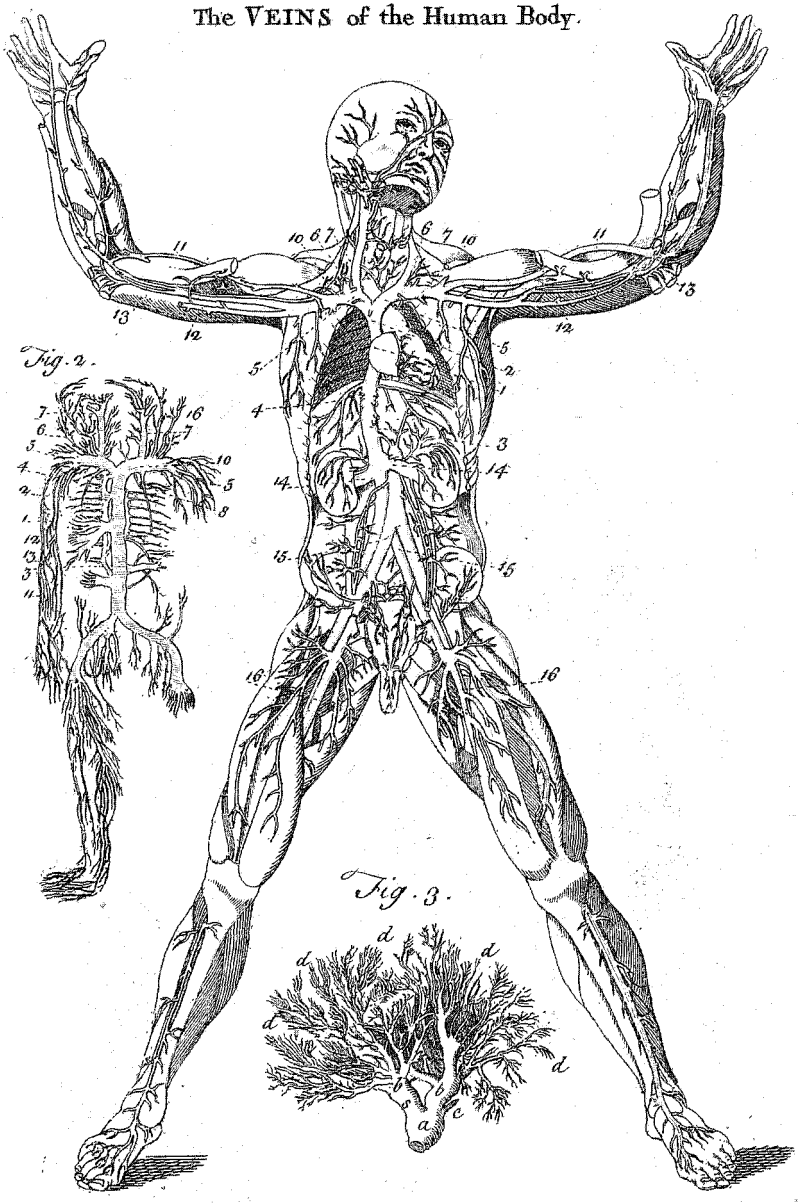
From it ariſe the following veins; *viz.* the diaphragmatic, hepatic, and renal or emulgent veins, which laſt go to the kidnies, and are marked 14, 14; alſo the ſpermatic veins, ſacra and iliacs, which laſt are marked 15, 15; and from theſe, on each ſide, ariſe hypogaſtrics and epigaſtrics, as alſo the crural veins, which go to the feet, and are marked 16, 16; the internal branch of this, toward the internal malleolus, is called the ſaphœna; and its external branch about the knee, the poplitæa; in the leg it is called ſuralis; and about the great toe of each foot, the cephalic vein of the foot. See the article DIAPHRAGMATIC, *&c.*

The vena portæ has ſome kind of reſemblance to a tree in its ſtructure; its roots, or inferior branches, being divided into the right and left. From the right ariſe all the meſeraic veins of the inteſtines, the internal hæmorrhoidal, and the right epiploics: the left is called the ſplenic vein; from which ariſe the gaſtrics, the vaſa brevia, the pancreatic epiploic, and ſometimes alſo the internal hæmorrhoidal vein. The trunk of the vena portæ affords the cyſtic veins, the right gaſtric, duodenal, *&c.* And laſtly, where the trunk begins to explicate, it conſtitutes the ſinus portæ in the liver; and from this it is divided into innumerable branches, diſperſed through the whole ſubſtance of the liver. See LIVER, MESERAIC, *&c.*

The third primary vein is the pulmonary one, which ariſes from the left auricle of the heart, where it firſt forms a ſinus; and is, ſoon afterwards, divided into four branches, and finally into innumerable ramifications, diſtributed through the whole ſubſtance of the lungs (*ib.* fig. 3.) repreſents the pulmonary vein in the time of expiration;

Fig. 1.

The VEINS of the Human Body.



tion; *a* being its trunk, cut close to the base of the heart; *b*, *b*, its divisions to the right and left lobe of the lungs; *c* the canalis arteriosus; *d*, *d*, the extremities of the arteries freed from the vesicles of the lungs, and their inosculations with the pulmonary veins.

VEIN, among miners, is that space which is bounded with woughs, and contains ore, spar, canck, clay, chirt, croil, brownhen, pitcher-chirt, cur, which the philosophers call the mother of metals, and sometimes soil of all colours. When it bears ore, it is called a quick vein; when no ore, a dead vein. See TRACING.

VEJOURS, *visores*, in law, are those sent by the court, to take a view of any place in question for the better decision of the right.

It is also used for those who are sent to view such as essoign themselves de malo lecti, whether in truth they be such as that they cannot appear, or whether they be counterfeit. See ESSOIGN.

VEIT, or *St.* VEIT, the name of two towns in the circle of Austria, in Germany; one in the dutchy of Carniola, and the other in that of Carinthia.

VELA, a remarkable cape on the coast of Terra Firma, in west long. 73° 30′, and north lat. 12°.

VELAMENTUM BOMBYCINUM, a name which some anatomists give to the velvet membrane, or inner skin, of the intestines. See INTESTINES.

VELAY, the north-east division of Languedoc, in France.

VELDENTS, a town in the circle of the Lower Rhine, in Germany, situated on the east side of the river Moselle, fifteen miles east of Triers.

VELEZ, a town of New Castile, fifty miles south-east of Madrid.

VELIRA, a town of Sclavonia, sixty miles north-west of Posega: east long. 17° 31′, north lat. 46° 15′.

VELLA, in botany, a genus of the *tetradynamia siliculosa* class of plants, with a tetrapetalous cruciform flower: the stamina are six filaments, about the length of the cup; and the fruit is a globose, cristated, bilocular pod, containing a few roundish seeds.

VELLETRI, a town of the Campania of Rome, about twenty miles east of that city.

VELLICATION, among physicians, the act of twitching. The word is more particularly applied to a sort of sudden convulsions that happen to the fibres of the muscles.

VELOCITY, swiftness, or that affection of motion whereby a moving body is disposed to run over a certain space in a certain time. See MOTION.

For the velocity of falling bodies, see the article ACCELERATION.

VELOM, a kind of parchment, finer, evener, and whiter than the common sort. See the article PARCHMENT.

VELVET, a rich kind of stuff, all silk, covered on the outside with a close, short, fine, soft shag, the other side being a very strong close tissue.

The nap or shag, called also the velveting, of this stuff, is formed of part of the threads of the warp, which the workman puts on a long narrow-channeled ruler or needle, which he afterwards cuts, by drawing a sharp steel tool along the channel of the needle to the ends of the warp.

The principal and best manufactories of velvet are in France and Italy, particularly in Venice, Milan, Florence, Genoa, and Lucca: there are others in Holland, set up by the french refugees; whereof that at Harlem is the most considerable: but they all come short of the beauty of those in France, and, accordingly, are sold for 10 or 15 *per cent.* less. There are even some brought from China, but they are the worst of all.

There are velvets of various kinds; as plain, that is, uniform and smooth, without either figures or stripes.

Figured velvet, that is, adorned and worked with divers figures, though the ground be the same with the figures; that is, the whole surface velveted.

Ramage or branched velvet, representing long stalks, branches, *&c.* on a sattin ground, which is sometimes of the same colour with the velvet, but more usually of a different one. Sometimes, instead of sattin, they make the ground of gold and silver; whence the denominations of velvets with gold ground, *&c.*

Shorn velvet, is that wherein the threads, that make the velveting, have been ranged in the channeled ruler, but not cut there.

Striped velvet, is that wherein there are stripes of divers colours running along the warp, whether these stripes be partly velvet, and partly sattin, or all velveted.

Cut velvet, is that whereon the ground is a kind of taffety, or gros de tours, and the figures velvet.

Velvets are likewise distinguished, with regard

regard to their different degrees of ſtrength and goodneſs, into velvets of four threads, three threads, two threads, and a thread and a half: the firſt are thoſe where there are eight threads of ſhag, or velveting, to each tooth of the reed; and the ſecond have only ſix, and the reſt four.

In general, all velvets, both worked and cut, ſhorn and flowered, are to have their warp and ſhag of organſin, ſpun and twiſted, or thrown in the mill; and their woof of ſilk well boiled, *&c.* They are all of the ſame breadth.

VENA, VEIN, in anatomy. See the article VEIN.

VENAFRO, a town of Italy, twenty-five miles north of Naples.

VENAISSIN, the territory whereof Avignon is the capital. See AVIGNON.

VENAL, or VENOUS, among anatomiſts, *&c.* ſomething that bears a relation to the veins. See the article VEIN.

This word is alſo uſed for ſomething bought with money, or procured by bribes.

VENANT, or *St.* VENANT, a town of Artois, twenty miles weſt of Liſle.

VENCE, a town of Provence, in France, ſituated on the confines of Piedmont, ten miles weſt of Nice.

VENDEE, in law, ſignifies the perſon to whom a thing is ſold; in oppoſition to vendor, or ſeller.

VENDITIONI EXPONAS, in law, a judicial writ directed to the ſheriff, commanding him to ſell goods, which he had formerly, by command, taken into his hands, for the ſatisfying a judgment given in the king's court.

VENDOSME, a town of Orleanois, in France, ſituated on the river Loire, thirty-ſeven miles weſt of Orleans.

VENEERING, VANEERING, or FINEERING, a kind of marquetry, or inlaying, whereby ſeveral thin ſlices or leaves of fine woods, of different kinds, are applied and faſtened on a ground of ſome common wood. See MARQUETRY.

There are two kinds of inlaying; the one, which is the moſt common and more ordinary, goes no farther than the making of compartments of different woods; the other requires much more art, in repreſenting flowers, birds, and the like figures.

The firſt kind is properly called veneering; the latter is more properly called marquetry.

The wood uſed in veneering is firſt ſawed out into ſlices or leaves about a line in thickneſs; *i. e.* the twelfth part of an inch. In order to ſaw them, the blocks or planks are placed upright, in a kind of ſawing-preſs. See SAWING-MILL.

Theſe ſlices are afterwards cut into narrow ſlips, and faſhioned divers ways, according to the deſign propoſed; then the joints having been exactly and nicely adjuſted, and the pieces brought down to their proper thickneſs, with ſeveral planes for the purpoſe, they are glued down on a ground or block, with good ſtrong engliſh glue.

The pieces being thus jointed and glued, the work, if ſmall, is put in a preſs; if large, 'tis laid on a bench covered with a board, and preſſed down with poles or pieces of wood, one end of which reaches to the ceiling of the room, and the other bears on the board.

When the glue is thoroughly dry, it is taken out of the preſs and finiſhed; firſt with little planes, then with divers ſcrapers, ſome of which reſemble raſps, which take off the dents, *&c.* left by the planes.

After it has been ſufficiently ſcraped, they poliſh it with the ſkin of a ſea-dog, wax and a bruſh, or poliſher of ſhave-graſs; which is the laſt operation.

VENEREAL, ſomething belonging to venery; as the lues venerea, french diſeaſe, or pox. See POX, GONORRHOEA, *&c.*

VENERIS OESTRUM, the ſtimulus or incentive of venery, is an appellation given by ſome anatomiſts to the clitoris.

VENERIS OESTRUM is alſo uſed by others for the tranſport of love, or the utmoſt extacy of deſire, or enjoyment, in coition.

VENERY, is uſed for the the act of copulation, or coition, of the two ſexes. See the article GENERATION.

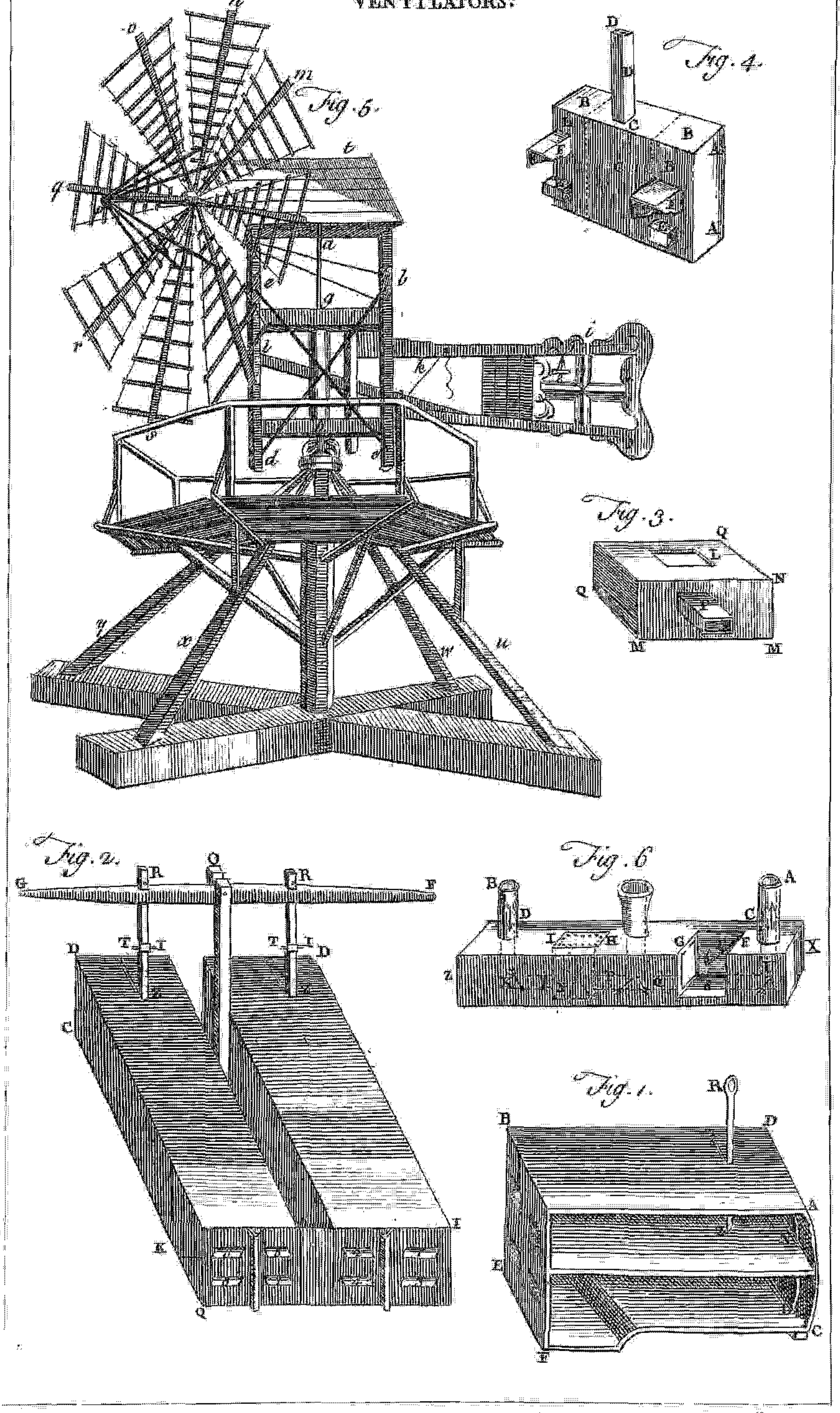
VENERY alſo denotes the act or exerciſe of hunting wild beaſts, which are alſo called beaſts of venery, and beaſts of the foreſt. See the article GAME.

VENESECTION, or PHLEBOTOMY, in ſurgery. See the article PHLEBOTOMY.

VENEZUELA, a province of Terra Firma, lying on the northern ocean, and having new Andaluſia on the eaſt, new Granada on the ſouth, and the river De la Hacha on the weſt.

VENICE, the capital of a republic in Italy, of the ſame name, is ſituated in the Lagunes, or ſmall iſlands, of the gulph of Venice, about five miles from the continent: eaſt longit. 13°, and north lat. 45° 40'.

VENTILATORS.



J. Jefferys sculp.

Venice is ſo happily ſituated, that no army can approach it by land; the avenues to thoſe iſlands being ſo exceeding difficult, that they have not thought it neceſſary to incloſe the city with a wall.

Nothing can appear more beautiful than this city, as we approach it either from the continent or the ſea, with its numerous palaces and lofty towers: its circumference is about ſix miles, and its inhabitants are computed at two hundred thouſand.

VENIRE FACIAS, in law, is a judicial writ lying where two parties plead and come to iſſue; directed to the ſheriff, to cauſe twelve men, of the ſame neighbourhood, to meet, and try the ſame, and to ſay the truth upon the iſſue taken.

VENLO, a town of dutch Gelderland, ſituated on the river Maes, nine miles ſouth of Gelder.

VENOSA, a town of Italy, eighty miles eaſt of Naples.

VENT, VENT-HOLE, or SPIRACLE, a little aperture left in the tubes or pipes of fountains, to facilitate the air's eſcape; or, on occaſion, to give them air, as in froſty weather, *&c.* for want of which they are apt to burſt. See PIPE.

Vent is likewiſe applied to the covers of wind-furnaces, whereby the air enters, which ſerves them for bellows, and which are ſtopped with regiſters or ſluices, according to the degree of heat required, as in the furnaces of glaſs-houſes, aſſayers, *&c.*

VENTA DE CRUZ, a town of Terra Firma, forty miles ſouth of Porto Bello.

VENTER, BELLY, in anatomy, a cavity in the body of an animal, containing viſcera, or other organs neceſſary for the performance of divers functions.

Phyſicians divide the human body into three venters, regions, or cavities; the firſt, the head, containing the brain, *&c.* See the article SKULL, *&c.*

The ſecond, the breaſt, or thorax, as far as the diaphragm, containing the organs of reſpiration. See THORAX.

The third, which is what we call the venter, or belly, is that wherein the inteſtines and organs of generation and digeſtion are contained; called, by anatomiſts, the abdomen. See ABDOMEN.

VENTER is alſo uſed in ſpeaking of a partition of the effects of a father and mother, among children born, or accruing from different marriages.

VENTER is alſo uſed for the children whereof a woman is delivered at one pregnancy: thus, two twins are ſaid to be of the ſame venter.

VENTER, or BELLY *of a muſcle*, is the fleſhy or belly-part thereof, as contradiſtinguiſhed from the two tendons, its extremes, one whereof is called the head, and the other the tail, of the muſcle. See the article MUSCLE.

VENTER DRACONIS, DRAGON'S BELLY, in aſtronomy, denotes the middle of a planet's orbit, or that part moſt remote from the nodes, *i. e.* from the dragon's head and tail; being the part which has the greateſt latitude, or is at the greateſt diſtance from the ecliptic.

VENTIDUCTS, in building, are ſpiracles or ſubterraneous places, where freſh, cool wind being kept, they are made to communicate, by means of tubes, funnels, or vaults, with the chambers or other apartments of a houſe, to cool them in ſultry weather.

VENTILATOR, a machine by which the noxious air of any cloſe place, as an hoſpital, goal, ſhip, chamber, *&c.* may be changed for freſh air. The noxious qualities of bad air have been long known, though not ſufficiently attended to, in practice; but it is to be hoped, that the indefatigable pains taken by Dr. Hales, to ſet the miſchiefs ariſing from foul air in a juſt light, and the remedy he has propoſed by the uſe of his ventilators, will at length prevail over that unaccountable ſloth or obſtinacy, which, where particular intereſts are not concerned, ſeems to poſſeſs the generality of mankind, and which rarely allows them to give due attention to any new diſcovery. The ventilators invented by that ingenious gentleman, conſiſt of a ſquare box, ABCD (plate CCXCIV. fig. 1.) about ten feet long, five wide, and two deep; in the middle of which is placed a broad partition, or midriff, made to move up and down, from A to C, on hinges at the end E, by means of an iron-rod ZR, fixed to the midriff at Z. Another box, of the ſame ſize with the former, having a like midriff, bar, *&c.* is placed near the former, *ibid.* fig. 2. with its rod RZ. Both theſe rods are fixed to a lever FG, moveable on the center O; ſo that by the alternate riſing and depreſſing of the lever FG, the midriffs are alſo raiſed and depreſſed alternately, by which means theſe double bellows are at the ſame time both drawing and pouring out the air. That the midriffs may be rendered lighter, they may be made of four bars lengthwiſe,

and as many placed croſs them, each about three inches broad, and an inch thick, the vacant ſpaces being filled up with thin pannels of fir-board. In order to make the midriffs move with greater eaſe, and without touching the ſides of the boxes, there is an iron-regulator NL, fig. 1. fixed upright to the middle of the end AC of the box. As very little air will eſcape if the edges of the midriff be within one twentieth part of an inch from the ſides of the box, there is no neceſſity for leathern ſides, as in common bellows. The end AC of the box muſt be ſomewhat circular, that it may be the better adapted to the riſing and falling of the midriff; and at the other end of the midriff a ſlip of leather may be nailed over the hinges.

To the ventilators above deſcribed, eight valves are adapted for the air to paſs through; theſe valves are placed at the hinge-end BQ, fig. 2. numbered 1, 2, 3, 4, &c. The valve 1 opens inward, to admit the air to enter, when the midriff is depreſſed at the other end, by means of the lever FG; and at the ſame time the valve 3, in the lower ventilator, is ſhut by the compreſſed air, which paſſes out at the valve 4: but when that midriff is raiſed, the valve 1 ſhuts, and the air paſſes out at the valve 2. The ſame is to be obſerved of the valves 5, 6, 7, 8, of the other box; ſo that when by the motion of the lever FG, the midriffs are alternately riſing and falling, then two of the ventilators are conſtantly drawing in the air, and two of them at the ſame time are blowing it out at their proper valves, the air entering at the valves 1, 3, 6, 8, and paſſing out at the valves 2, 4, 5, 7. To the ventilators, before the valves, is fixed a box QQMM, fig. 3. as a common receptacle for all the air that comes out of theſe valves, which air is conveyed away through the trunk P, paſſing through the wall of a building, &c.

From the foregoing explanation, the nature of ventilators may be eaſily underſtood, and therefore we ſhall be briefer in the following deſcription of thoſe lately erected in Newgate, for exhauſting that priſon of its foul air. In this priſon then there are ſeven ventilators, each nine feet long, and four feet and a half wide; two pair of which are laid on each other: theſe ventilators are worked by means of a wind-mill. The valves of the ventilators open into a large wooden box AB, fig. 4. which is faſtened to the ventilators by the hooks AA: this box is divided into three ſpaces; the middle, or largeſt, CC, receives all the foul air diſcharged by the ventilators, whence it paſſes through a trunk DD, ſixteen inches wide, through the leads into the open air. The outer ſpaces BBBB, receive the foul air through the trunks FF, from the ſeveral wards, from whence it is conveyed into the ventilators, through thoſe valves which open inward, and then diſcharged by the other valves of the ventilators, into the middle partition of the box, and from thence conveyed, by the pipe DD, into the open air. Theſe ventilators are fixed in an upper room of Newgate, in order to be near the leads, where the wind-mill, which works them, is erected; and from each of the outer noſtrils FF, there are trunks, with ſliding ſhutters, paſſing into the ſeveral wards; ſo that by opening theſe trunks, any of the wards may be ventilated, either ſingly, or ſeveral at a time. That the midriffs may not be ſpoiled for want of air, when all the trunks are ſhut, there are two holes cut in the outer noſtrils, at EE, which are covered with boxes twenty inches long, and fourteen wide. In the bottom of each of theſe boxes is a large moveable valve, of ſuch a weight as not to open but when all the other paſſages for the air are ſtopped: by means of theſe valves the ventilators are ſupplied with air, when all the trunks, going into the ſeveral wards, are cloſed, and the midriffs are not in danger of breaking for want of it.

The wind-mill, fig. 5. erected for working the ventilators, is deſigned to move with a ſmall degree of wind, that the ventilators may be the oftener worked. The mill-poſt is fixed on four croſs-trees, and ſupported by the braces *uwxy*. This poſt is hollow, that the iron-rod *a*, may paſs through, the lower end of it being fixed to the lever of the ventilators. The upper end of this rod goes to the iron-axle-tree, which has a crank ſix inches long, and therefore gives a ſtroke of thirteen inches; and the other end being fixed to the lever, at a proper diſtance from the center of its motion, raiſes the midriffs fifteen inches. The iron-axle-tree extends about two feet beyond the face of the ſails, from the extremity of which, *p*, eight iron-braces go to the vanes *m*, *n*, *o*, *p*, *q*, *r*, *s*, &c. The frame turns on the poſt, on friction-wheels, ſo that the

ſails

ſails always face the wind, by means of the vane *i*; *l* is the break-pole, which, by pulling the rope *k*, ſtops the mill: *b*, *d*, *c*, *e*, are iron-braces, faſtened at each end with iron-bolts, to keep the frame from wracking. See WIND-MILL.

Fig. 6. repreſents an inſtrument invented for going with ſafety into damps, and other noxious air. XZ repreſents a ſquare piece of elder, or willow, a foot long, and two inches both in breadth and depth, with a hole, KLQU, five eighths of an inch diameter, bored through it; and, at CD, ſhort foſſets, with like holes bored through them; to which foſſets hollow reed-canes are to be fixed by means of ſhort ſupple leathern pipes, ſo as to be flexible at theſe joints. N, T, S, are ſquare holes, two inches deep, and an inch and three quarters wide, with their leathern covers FG, HI, nailed over them. IN is a broad leathern valve, moving on joints at I, ſo as to open, by the force of the air, which paſſes down the pipe BKL, when the breath is drawn in at the mouth at the middle foſſet, which ſtands five eighths of an inch above GH. GS is another like valve, which ſhuts the hole, at Q, cloſe, while the breath is drawing in, through the middle foſſet; but when, on the contrary, the perſon breathes out through the middle foſſet, the valve IN cloſes the hole L, and the other valve GS opens for the breath to paſs freely off through the pipe UA; by which means the perſon always draws in freſh air. There are two ſtiff wires as T, fixed to prevent the valves opening too far, leſt the force of the breath, which is but ſmall, ſhould not ſhut them. This inſtrument is to be fixed to the mouth by a tape, or cord, tied round the head; and it will be convenient to have cuſhions at the corners C and D, for the cheeks to bear off a part of the preſſure. By the help of this inſtrument a perſon may go into a ſuffocating air, as in ſome mines, *&c.* his noſtrils being ſtopped with cotton, without any danger of ſuffocation.

VENTIMIGLIA, a port-town of Italy, belonging to the Genoeſe, ſituated on the Mediterranean, 100 miles ſouth-weſt of Genoa: eaſt lon. 7° 30′, north lat. 43° 45′.

VENTRICLE, *ventriculus*, properly denotes any little cavity; but is more particularly uſed, by phyſicians and anatomiſts, for the ſtomach. See STOMACH.

For thoſe cavities of the heart and brain, called ventricles, ſee HEART and BRAIN.

VENTRILOQUOUS, an appellation given to the engaſtrimythi. See the article ENGASTRIMYTHI.

VENTURINE, or ADVENTURINE, is ſometimes uſed for the fineſt and ſlendereſt gold-wire uſed by embroiderers. See the article WIRE.

VENUS, in aſtronomy, one of the inferior planets, revolving round the ſun, in an orbit between that of mercury and the earth. See PLANET, ORBIT, *&c.*

According to Mr. Caſſini, the greateſt diſtance of venus from the earth is 38415, the mean diſtance 22000, and the leaſt diſtance 5585, ſemi-diameters of the earth. Her diſtance from the ſun is $\frac{723}{1000}$ of the earth's diſtance from the ſun. her excentricity 5; the inclination of her orbit 3° 23′; and her parallax 3′. See the articles DISTANCE, EXCENTRICITY, INCLINATION, and PARALLAX.

The ſemi-diameter of venus is to that of the earth as 10 to 19; her periodical courſe round the ſun is performed in 224 days, 17 hours; and her motion round her own axis in 23 hours. See the article DIAMETER and PERIOD.

Venus is eaſily diſtinguiſhed by her brightneſs and whiteneſs, which exceeds that of all the other planets, and which is ſo conſiderable, that in a duſky place ſhe projects a ſenſible ſhadow. She conſtantly attends the ſun, and never departs from him above 47°. When ſhe goes before the ſun, that is, riſes before him, ſhe is called phoſphorus, or lucifer, or the morning ſtar; and when ſhe follows him, that is, ſets after him, heſperus, or veſper, or the evening ſtar. See PHOSPHORUS, VESPER, *&c.*

The eye in venus will behold four planets above it, *viz.* our earth, mars, jupiter, and ſaturn; and one below it, which is mercury: and when our earth is in oppoſition to the ſun, it will appear then (in the night) to ſhine with a full orb, and be very bright. The moon will appear always to accompany the earth, and never to be ſeen from her above half a degree. Mercury will never appear to be above 38° diſtant from the ſun.

October 14, 1666, N. S. Caſſini obſerved ſeveral ſpots in the body of this planet, by whoſe motion he judged (though he was not certain) that ſhe moved either by a circulation, or a kind of libration round her axis, in about 23 hours. See the article LIBRATION.

A. D. 1672, and 1686, the ſame aſtronomer, with a teleſcope of 34 feet, believes he ſaw a ſatellite moving round this

planet, and diſtant from it about three fifths of venus's diameter. It had the ſame phaſes with venus, but was without any well defined form, and its diameter ſcarce exceeded one fourth of that of venus.

Dr. Gregory thinks it more than probable, that this was a ſatellite; and ſuppoſes the reaſon why it is not uſually ſeen, to be the unfitneſs of its ſurface to reflect the rays of the ſun's light; as is the caſe of the ſpots in the moon, of which, if the whole diſc of the moon were compoſed, he thinks that the planet could not be ſeen in venus.

Venus, when viewed through a teleſcope, is rarely ſeen to ſhine with a full face, but has phaſes juſt like thoſe of the moon, being now gibbous, now horned, *&c.* and her illumined part conſtantly turned towards the ſun, *i. e.* looks towards the eaſt, when phoſphorus, and towards the weſt, when heſperus. See PHASES.

M. De la Hire, in 1700, through a teleſcope of 16 feet, diſcovered mountains in venus, which he found to be larger than thoſe in the moon, See MOON.

Sometimes ſhe is ſeen in the diſc of the ſun, in form of a dark round ſpot. See the article TRANSIT.

The phænomena of venus evidently ſhew the falſity of the ptolemaic ſyſtem, for that ſyſtem ſuppoſes that venus's orb incloſes the earth. See COPERNICAN SYSTEM.

VENUS, in chemiſtry, the ſame with copper. See the article COPPER.

VERA, a port-town of Spain, in the province of Granada, forty-four miles ſouth-weſt of Carthagena.

VERA CRUZ, a port-town of Mexico, with a ſtrong and commodious harbour, ſituated on the gulph of Mexico, in weſt lon. 100°, north lat. 18° 30′.

VERA PAZ, or COBAN, the capital of a province of the ſame name, in Mexico: weſt long. 93°′, and north lat. 15° 6′.

VERAGUA, a province of Mexico, ſituated on the South ſea, weſtward of the gulph of Panama.

VERATRUM, the WHITE-HELLEBORE, in botany, a genus of the *polygamia-monoecia*, claſs of plants, the hermaphrodite corolla whereof conſiſts of ſix oblong, lanceolated, ſerrated petals; the male corolla is divided into ſix parts; the fruit conſiſts of three oblong, erect, compreſſed capſules, made up of one valve, and containing only one cell; the ſeeds are numerous, compreſſed, and truncated, and more obtuſe upon one extremity. For the virtues of this plant, ſee the article *White* HELLEBORE.

VERB, in grammar, a word ſerving to expreſs what we affirm of any ſubject, or attribute to it; or, according to others, it is a word principally uſed to ſignify the affirmation, and ſhews that the diſcourſe, wherein it is uſed, is that of a man, who not only has a conception of things, but judges or affirms ſomething of them: though it is principally uſed in this ſenſe, yet it is made uſe of alſo to ſignify other motions of the ſoul, as to deſire, to pray, to command; but this it only does by changing the mood or inflexion. The verb, in its primary ſignification, ſhould have no other uſe, but to mark the connexion which we make in the mind, between the two terms of a propoſition: but the *eſſe, to be*, is the only one that has retained this ſimplicity; nor, in ſtrictneſs, has this retained it, but in the third perſon, as *eſt, is*. Men being naturally inclined to ſhorten their expreſſions, to the affirmation they have almoſt always added other ſignifications, in the ſame word, ſo as that two words make a propoſition; as in *Petrus vivit, Peter lives*; where *vivit* includes both the attribute and affirmation; it being the ſame thing to ſay, *Peter lives*, as that *Peter is living*; and hence the great variety of verbs in every language. To conſider ſimply what is eſſential to a verb, the only true definition is, a word ſignifying an affirmation; but if we ſhould chuſe to add its principal accidents, it may be defined thus; a word which ſignifies affirmation, with the deſignation of perſon, number, and time.

Verbs are variouſly divided: with reſpect to the ſubject, they are divided into active, paſſive, neuter, *&c.* with reſpect to their inflexions, into regular, irregular, perſonal, imperſonal, auxiliary, ſubſtantive, *&c.* A verb active is a verb which expreſſes an action that falls on another ſubject or object; ſuch are *I love, I work, &c.* which ſignify the action of loving, working, *&c.* of theſe there are three kinds; the one called tranſitive, where the action paſſes to a ſubject different from the agent; reflected, where the action returns upon the agent; and reciprocal, where the action returns mutually upon the two agents that produced it. A verb paſſive is that which expreſſes a paſſion, or which receives the action of ſome agent; and which is conjugated in the modern tongues, with the auxiliary verb *I am*,

je fuis. A verb neuter, is that which ſignifies an action that has no particular object whereon to fall, but which of itſelf takes up the whole idea of the action, as *I ſleep, thou yawneſt, he ſnores, we walk, you run, they ſtand:* the Latins called them neuters, becauſe they are neither active, nor paſſive, though they have the force and ſignification of both. Of theſe verbs ſome form their tenſes by the auxiliary verb *to have*, as *I have ſlept, you have run*; and they are called neuter actives. There are others which form their compound parts by the auxiliary *to be*, as *I am come*; theſe are called neuters paſſive. A verb ſubſtantive is that which expreſſes the being or exiſtence of a thing, as *I am, thou art*. Auxiliary or helping verbs, are thoſe which ſerve in conjugating active and paſſive verbs, ſuch are *I am, I have, &c.* Verbs in engliſh, and moſt modern tongues, do not change their terminations, as in latin, to expreſs the ſeveral times, modes, *&c.* but they make uſe of auxiliaries, as *have, am, be, do, will, ſhall, &c.* Regular verbs are thoſe which are conjugated after ſome one manner, rule, or analogy. Irregular or anomalous verbs, are ſuch as have ſomething ſingular in the terminations or formations of their tenſes. Verbs impersonal are thoſe which have only the third perſon, as *it behoves, &c.* See IMPERSONAL, *&c.*

VERBAL, ſomething that belongs to verbs, or even to words of any kind ſpoken with the mouth. See VERB and WORD.

Thus, verbal nouns, among grammarians, are thoſe formed of verbs. See the article NOUN.

Again, a verbal contract is one made merely by word of mouth in oppoſition to that made in writing. See the articles CONTRACT and DEED.

VERBASCUM, MULLEIN, in botany, a genus of the *pentandria-monogynia* claſs of plants, the flower of which is monopetalous, with a ſhort cylindraceous tube, and a quinquepartite and rotated limb: the fruit is a roundiſh and bilocular capſule, containing numerous angulated ſeeds.

Mullein-leaves are recommended as emollient, and eſteemed, by the Italians, in conſumptions: its flowers have an agreeable honey-like ſweetneſs; and an extract prepared from them, by rectified ſpirit of wine, taſtes extremely pleaſant.

VERBENA, VERVAIN, in botany, a genus of the *diandria-monoecia* claſs of plants, with a monopetalous flower, ſemiquinquifid at the limb; the ſeeds are two or four, and contained in the cup.

Vervain is quite diſregarded in the preſent practice, as appearing almoſt ſimply herbaceous.

VERBERATION, *ſmiting*, in phyſics, a term uſed to expreſs the cauſe of ſound, which ariſes from a verberation of the air, when ſtruck in divers manners by the ſeveral parts of the ſonorous body firſt put into a vibratory motion.

VERBESINA, in botany, a genus of the *ſyngeneſia-polygamia-ſuperflua* claſs of plants, with a radiated flower, made up of hermaphrodite tubuloſe ones on the diſc, and a few ligulated ones on the verge; the ſeeds are angulated, and contained in the cup.

VERCELLI, a city of Piedmont, in Italy, forty-five miles north-eaſt of Turin.

VERD, or CAPE-VERD, a promontory of Africa, forty miles north-weſt of the mouth of the river Gambia: weſt long. 18°, north lat. 15°.

There are a number of iſlands in the Atlantic ocean, called Cape-Verd-iſlands, from their being ſituated off this cape.

VERDEGREASE, or VERDEGRIS, a kind of ruſt of copper, much uſed by painters as a green colour.

Verdegreaſe is properly no other than copper, diſſolved by a mild acid into the form of an ærugo, or ruſt. After preſſing the grapes for wine, the huſks, ſtones, and other refuſe are laid to be dried in the ſun; they are then moiſtened with the ſtrongeſt wine that can be had, and laid together in veſſels till they begin to ferment; after nine or ten days the matter is preſſed, and worked into balls between the hands, and laid in an orderly manner over the bottom of an earthen veſſel, and as much wine is laid over them as will cover them half way up. The veſſels are then covered with a looſe lid, and ſet in a cellar where the balls are left in the wine about fifteen hours, a perſon turning them four or five times in that ſpace, in order to make the wine ſoak perfectly through them; after this, ſome wooden bars are placed acroſs the veſſel, about half an inch above the ſurface of the wine, and the balls are laid out of the wine upon theſe; the veſſels are then ſhut up, and the whole left in this ſtate for ten days or more: at the end of this time the balls emit a very penetrating ſcent, and are fit for diſſolving copper. They are now to be broke to pieces, and the outſide mixed with

with the internal part, which is moiſter; they are then laid with thin plates of copper, ſtratum ſuper ſtratum, in the ſame veſſels upon the bars, and the whole is left for a week or a fortnight, at the end of which time the plates are found covered with verdegreaſe, which is not taken off immediately: but they are wrapped up in cloths wetted with wine, and laid by a week or more, and then the ærugo or verdegreaſe is taken off for uſe.

This ruſt of copper is rarely uſed internally, nor ought it, unleſs in the moſt deſperate caſes, where an inſtantaneous vomiting is neceſſary. Externally it is much uſed as a detergent or deſiccative: it eats off fungous fleſh in ulcers, and, mixed with honey, is uſed in aphthæ and ulcerations of the mouth. It is the baſis of what is called the egyptian ointment, and of many other compoſitions in the ſame intention. There is a preparation of this ærugo of copper, in ſome uſe at preſent both in medicine and in painting, which ought not to be omitted here: it is called, though very imperfectly, diſtilled verdegreaſe; it is a cryſtallization of verdegreaſe, prepared thus: bruiſe to a coarſe powder ſome fine green verdegreaſe, pour on it diſtilled vinegar; to the remainder continue to do this, till the liquor will no longer extract any colour from the maſs. Evaporate or diſtil theſe liquors, all mixed together, till a pellicle covers the ſurface, then ſet it in a cellar, and it will ſhoot into fine green cryſtals. Evaporate the remainder of the liquor, and ſet it to ſhoot again till no more will be produced. Theſe are the cryſtals of verdegreaſe, improperly called diſtilled verdegreaſe. They are better than the crude ſubſtance, for eating away proud fleſh. A ſolution of them in common water is an excellent detergent for old ulcers; and they are uſed in common eye-waters, to clear away ſpecks and films. Theſe cryſtals, diſtilled in a retort, afford, after an uſeleſs phlegm is come over, a noble acid, the richeſt that can be procured from vinegar. It is, by the chemical writers, called acetum eturiens; it is greatly celebrated for its virtues as a menſtruum, and worthy great praiſe, though not equal to all that is ſaid of it.

VERDERER, or VERDEROR, a judicial officer of the king's foreſt, whoſe buſineſs it is to look to the vert, and ſee it well maintained. See the article VERT.

VERDICT, is the anſwer of the jury given to the court, concerning the matter of fact, in any caſe civil or criminal, committed by the court to their trial and examination. See the article JURY.

A verdict is either general or ſpecial. A general verdict is that which is brought into the court in like general terms as the general iſſue, as, in an action of diſſeiſin, the defendant pleads no wrong, no diſſeiſin. Then the iſſue is general, whether the fact be wrong or not, which being committed to the jury, they, upon conſideration of the evidence, come in and ſay, either for the plaintiff, that it is a wrong diſſeiſin; or for the defendant, that it is no wrong diſſeiſin.

A ſpecial verdict, is, when they ſay at large, that ſuch and ſuch a thing they found to be done by the defendant or tenant; declaring the courſe of the fact, as in their opinion it is proved; and praying the judgment of the court, as to what is law in that caſe.

It is ſaid, that a jury may give a general or ſpecial verdict, in all actions and caſes; and that the court is obliged to receive it, provided it be pertinent to the point in iſſue: alſo if the jury will take upon them to bring in any thing that is matter of law, their verdict ſhall be received.

Verdicts are alſo public and private; public, when the ſame are given in open court; and private, when given out of court, before any of the judges: but a private verdict, in ſtrictneſs, is looked upon to be no verdict.

VERDITER, or VERDETER, a kind of mineral ſubſtance, ſometimes uſed by the painters, &c. for a blue; but more uſually mixed with a yellow for a green colour.

Verditer, according to Savary, ought to be made of the lapis armenus; or at leaſt of an earthy ſubſtance much like it, brought from the mountains of Hungary, &c. only prepared by powdering it, and cleanſing it by lotion.

But this ſtone being very rare, the verditer commonly uſed is not a native, but a factitious, ſubſtance; which ſome ſay is prepared by caſting wine or water upon new copper, as it comes red-hot out of the furnace, and catching the ſteams that riſe from it upon copper-plates: others again ſay, it is prepared by diſſolving copper plates in wine, much after the manner of verdegreaſe.

But the method of making it in England is as follows:

The refiners pour their copper-water into

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an hundred pound weight of whiting, ſtirring them well together every day for ſome hours, till the water grows pale; then they pour that off, and ſet it by for further uſe, and pour on more of the green water, repeating this till the verditer is made; which they then take out, and lay on large pieces of chalk in the ſun to dry.

The water which is poured off from the verditer, (which remains at the bottom of the tub) is put into a copper, and boiled till it comes to the conſiſtence of water-gruel; now, conſiſting principally of ſalt-petre reduced, moſt of the ſpirit of vitriol being gone with the copper into the verditer; and a diſh full of this being put into the other materials for aqua-fortis, is re-diſtilled, and makes what they call a double water, which is near twice as good as that made without it.

VERDOY, in heraldry, denotes a bordure of a coat of arms, charged with any kinds or parts of flowers, fruits, ſeeds, plants, *&c.*

VERDUN, a city of Lorrain, ſituated on the river Maes, forty miles north-weſt of Nancy.

VERGE, ſignifies the compaſs of the king's court, which bounds the juriſdiction of the lord ſteward of the houſhold; and which is thought to have been twelve miles round.

The term verge is alſo uſed for a ſtick or rod, whereby one is admitted tenant to a copyhold eſtate, by holding it in his hand, and ſwearing fealty to the lord of the manor.

VERGERS, certain officers of the courts of king's-bench and common-pleas, whoſe buſineſs it is to carry white wands before the judges.

There are alſo vergers of cathedrals, who carry a rod tipped with ſilver before the biſhop, dean, *&c.*

VERGETTE, in heraldry, denotes a pallet, or ſmall pale; and hence, a ſhield divided by ſuch pallets, is termed vergette. See the article PALE.

VERGILIÆ, in aſtronomy, a conſtellation the appearance of which denotes the approach of ſpring: it is the ſame with pleiades. See PLEIADES.

VERIFICATION, in general, is the act of proving a thing; but among the french, it only ſignifies the recording of the king's edicts by the parliament.

VERJUICE, a liquor obtained from grapes or apples, unfit for wine or cyder; or from ſweet ones, whilſt yet acid and unripe. Its chief uſe is in ſauces, ragouts, *&c.* though it is alſo an ingredient in ſome medicinal compoſitions, and is uſed by the wax-chandlers to purify their wax.

VERMICELLI, or VERMICHELLY, a compoſition of flour, cheeſe, yolks of eggs, ſugar, and ſaffron, reduced to a paſte, and formed into long ſlender pieces like worms, by forcing it with a piſton through a number of little holes.

It was firſt brought from Italy, where it is in great vogue: it is chiefly uſed in ſoups and pottages, to provoke venery, *&c.*

VERMICULAR, an epithet given to any thing that bears a relation or reſemblance to worms, vermiculi. See WORM.

Anatomiſts particularly apply it to the motion of the inteſtines and certain muſcles of the body.

The vermicular or periſtaltic motion of the inteſtines is performed by the contraction of the fibres thereof, from above downward; as the antiperiſtaltic motion is by their contraction from below upwards.

VERMIFORMIS, in anatomy, a term applied to various parts in the human body, bearing ſome reſemblance to worms. As ſome muſcles, proceſſes, *&c.*

Proceſſus, or *apophyſes* VERMIFORMES, two extremities of the cerebellum, ſituate near the fourth ventricle of the brain. See the article BRAIN.

VERMIFORMES *muſculi*, are the four muſcles in each hand and foot, which bring the fingers and toes towards the thumbs and great toes, called alſo lumbricales. See LUMBRICAL.

VERMILION, a very bright and beautiful red colour, in great eſteem among the antients, under the name of minium.

There are two kinds of it, the one natural, the other factitious. The natural is found in ſome ſilver mines, in the form of a ruddy ſand, which is afterwards prepared and purified by ſeveral lotions and coctions. The artificial is made of mineral cinnabar, ground up with aqua-vitæ and urine, and afterwards dried.

It is alſo made of lead burnt and waſhed, or of ceruſs prepared by fire: but this is not properly called vermilion, but minium, or red-lead. See MINIUM.

Yet this laſt, however, ſeems to be the real vermilion of the antients; and both apothecaries and painters ſtill give it the name, to enhance the price.

We have two kinds of vermilion from Holland, the one of a deep red, the other

other pale; but it is the ſame thing at the bottom. the only difference of colour proceeding from the cinnabar's being more or leſs ground: when the cinnabar is finely ground, the vermilion is pale; and this is preferred before that which is coarſer and redder.

It is of very great uſe with painters in oil and miniature; and among the ladies for a fucus, or paint, to heighten the complexion of ſuch as are too pale.

Some diſapprove of vermilion to be uſed in painting prints, unleſs it be prepared by waſhing, as is directed for minium; and then chiefly for dry painting, except it be by thoſe perſons who can uſe it moderately, and with judgment; for all heavy colours will drown the ſhades or ſtrokes of the engraver.

VERMIN, *vermina*, a collective name including all kinds of little animals, or inſects, which are hurtful or troubleſome to men, beaſts, fruits, *&c.* as worms, lice, fleas caterpillars, ants, flies, *&c.* See the articles WORM, *&c.*

VERMINATION, *verminatio*, the act of breeding worms, and other vermin; particularly bots, in cattle, *&c.*

VERMINATION, is ſometimes alſo uſed, among phyſicians, for a ſort of tormina ventris, or wringing of the guts, wherein the patient is affected, as if worms were gnawing his inteſtines. See GRIPES.

VERMIVOROUS ANIMALS, are ſuch as feed upon worms. See ANIMAL.

VERNACULAR, is applied to any thing that is peculiar to ſome one country.

VERNAL, ſomething belonging to the ſpring ſeaſon. See SPRING.

Hence vernal leaves, are thoſe leaves of plants which come up in the ſpring.

Vernal ſigns, are thoſe which the ſun is in during the ſpring ſeaſon, *viz.* aries, taurus, and gemini. Vernal equinox, is that which happens when the ſun is aſcending from the equator towards the north pole. See LEAF, *&c.*

VERNEVIL, a town of Normandy, forty-three miles ſouth of Rouen.

VERNIER, or NONIUS, among mathematicians, a ſcale of diviſions, ſerving to cut the diviſions of an arch into ſingle minutes.

VERNIX, in botany, the name whereby ſome writers call the rhus. See RHUS.

VERONA, a city of Italy, in the territories of Venice, capital of the Veroneſe, ſituated on the river Adige: eaſt long. 11° 15′, north lat. 45° 20′.

VERONICA, in botany, a genus of the *decandria-monogynia* claſs of plants, the corolla whereof conſiſts of a ſingle petal; the tube is nearly of the length of the cup; the limb is plain, and divided into four parts; the ſegments are oval, and the lower one is narrower than any of the reſt; the ſegment over-againſt it, is broader than any; the fruit is a capſule of a turbinated cordated figure, with a compreſſed apex, it is compoſed of four valves, and contains two cells, in each whereof are numerous roundiſh ſeeds.

Among the ſpecies of this genus, are the common ſpeedwell, the brooklime, and the wild germander. See the article SPEEDWELL, *&c.*

Theſe and ſeveral other ſpecies of this genus, are famous in medicine; the common ſpeedwell is a good antiſcorbutic, and has lately been celebrated in the gout and rheumatiſm. The water-brooklime is alſo one of the antiſcorbutics of the ſhops, and its juice is alſo made a part of the ſpring juices given againſt thoſe complaints.

VERSAILLES, a town of France, in the province of the iſle of France, ſituated eleven miles weſt of Paris, where ſtands one of the moſt elegant and magnificent palaces in the world, built by Lewis XIV.

VERSE, *verſus*, in poetry, a line or part of a diſcourſe, conſiſting of a number of long and ſhort ſyllables, which run with an agreeable cadence, the like being alſo reiterated in the courſe of the piece. See the article POEM.

This repetition, according to F. Boſſu, is neceſſary to diſtinguiſh the notion of verſe from that of proſe; for in proſe, as well as verſe, each period and member are parts of diſcourſe, conſiſting of a certain number of long and ſhort ſyllables; only proſe is continually diverſifying its meaſures and cadences, and verſe regularly repeating them. This repetition of the poets appears even in the manner of writing; for one verſe being finiſhed, they return to the beginning of another line, to write the verſe following, and it is to this return, that verſe owes its name. See the article PROSE.

To make verſe, it is not enough that the meaſures and quantities of ſyllables be obſerved, and ſix juſt feet put one after another in the ſame line. There are further required, certain agreeable cadences, particular tenſes, moods, regimens, and even ſometimes words unknown in proſe. But what is chiefly required, is an elevated, bold, figurative

manner of diction; this manner is a thing ſo peculiar to this kind of writing, that without it, the moſt exact arrangements of longs and ſhorts does not conſtitute verſe ſo much as a ſort of meaſured proſe. The greek and latin verſes conſiſt of a certain number of feet, diſpoſed in a certain order; and ſome have attempted to make french and engliſh verſes on the ſame foundation, but without ſucceſs. Voſſius is very ſevere on the modern verſe, and makes it altogether unfit for muſic. Our verſes, ſays he, run all as it were upon one foot, without diſtinction of members or parts, and without regard to the natural quantities of ſyllables. We have no rythmus at all, and we mind nothing but to have a certain number of ſyllables in a verſe of whatever nature, and in whatever order. Mr. Malcolm vindicates our verſe from this imputation. It is true, ſays he, we do not follow the metrical compoſition of the antients, yet we have ſuch a mixture of ſtrong and ſoft, long and ſhort, ſyllables, as make our verſes flow ſmooth or rumbling, ſlow or rapid, agreeable to the ſubject. Inſtances of all which we have in the following lines of Pope.

Theſe equal ſyllables alone require,
Tho' oft' the ear the open vowels tire,
While expletives their feeble aid do join,
And ten low words oft creep in one dull line.
Soft is the ſtrain when Zephyr gently blows,
And the ſmooth ſtream in ſmoother numbers flows;
But when loud billows laſh the ſounding ſhore,
The hoarſe rough verſe ſhould like the torrent roar;
When Ajax ſtrives ſome rock's vaſt weight to throw,
The line too labours, and the words move ſlow.
Not ſo when ſwift Camilla ſcours the plain,
Flies o'er th' unbending corn and ſkims along the main.

By making a ſmall change or tranſpoſition of a word in any of theſe verſes, any body who has an ear will find, that we make a great matter of the nature and order of the ſyllables. See NUMBERS.

Voſſius adds, that the antient odes were ſung as to the rhythmus, in the ſame manner as we ſcan them, every pes being a diſtinct bar, or meaſure ſeparated by a diſtinct pauſe, though in reading, that diſtinction was not accurately obſerved. Laſtly, he obſerves, that their odes had a regular return of the ſame kind of verſe, and the ſame quantity of ſyllables, in the ſame place of every verſe; whereas, in the modern odes, to follow the natural quantity of our ſyllables, every ſtanza would be a diſtinct ſong. See ODE.

Verſes are of various kinds, ſome denominated from the number of feet, whereof they are compoſed, as the monometer, dimeter, trimeter, tetrameter, pentameter, hexameter, *&c.* See the article HEXAMETER, *&c.*

Some alſo, from the kinds of feet uſed in them, as the pyrrhichion, proceleuſmatic, iambic, trochaic, *&c.* See the article PYRRHICHION, *&c.*

Sometimes verſes are denominated from the names of the inventors, or the authors who have uſed them with moſt ſucceſs, as the anacreontic, archilochian, aſclepia, alcaic, ſapphic, *&c.* See the articles ANACREONTIC, *&c.*

The moderns have invented heroic or alexandrine verſes; the antients likewiſe invented various kinds of poetical devices in verſe, as centos, echos, *&c.* See the article ALEXANDRINE, *&c.*

VERSE, is alſo uſed for a part of a chapter, ſection, or paragraph, ſubdivided into ſeveral little articles. The whole bible is divided into chapters, and the chapters are ſubdivided into verſes. The diviſion of verſes in the new teſtament was firſt made by one Robert Stephens, with which diviſion many learned men find great fault, and yet it is every where followed.

VERSED *ſine of an arch*, a ſegment of the diameter of a circle, lying between the foot of a right ſine, and the lower extremity of the arch. See SINE.

VERSIFICATION, the art or manner of making verſe; alſo the tune and cadence of verſe. See the article VERSE.

Verſification is properly applied to what the poet does more by labour, art and rule, than by invention, and the genius or furor poeticus. See POETRY, *&c.*

VERSION, a tranſlation of ſome book or writing, out of one language into another.

VERT, in heraldry, the term for a green colour. It is called vert in the blazon of the coats of all under the degree of nobles; but in coats of nobility, it is called emerald; and in thoſe of kings, venus. In engraving, it is expreſſed by diagonals, or lines drawn athwart from

right to left, from the dexter chief corner to the ſiniſter baſe, as repreſented in plate CCXC. fig. 4.

VERT, or GREEN HUE, in foreſt law, any thing that grows and bears a green leaf within the foreſt, that may cover a deer. This is divided into over-vert and nether-vert; over-vert is the great woods which in law books are uſually called hault bois; nether vert is the under woods, otherwiſe called ſub-bois. We ſometimes alſo meet with ſpecial vert, which denotes all trees growing in the king's woods within the foreſt; and thoſe which grow in other men's woods, if they be ſuch trees as bear fruit to feed the deer.

VERTEBRÆ, in anatomy, the twenty-four bones of which the ſpine conſiſts, and on which the ſeveral motions of the trunk of our bodies are performed. See SPINE.

Each of theſe vertebræ is compoſed of its body and proceſſes. The body is the thick, ſpungy, anterior part, which is convex before, concave backwards, horizontal and plain in moſt of them above and below; their anterior and poſterior ſurfaces having ſeveral holes made in their thin external plate, both for the firmer connexion of the ligaments, and for the paſſage of veſſels into their cellular ſubſtance. Between theſe bodies of each two adjoining vertebræ, a ſubſtance between the nature of ligament and cartilage is interpoſed; which is compoſed of concentrical curve fibres, the exterior of which are the moſt ſolid and hard, while thoſe in the centre are very ſoft and full of a glairy liquor; and therefore this ſubſtance was called by the antients ligamentum mucoſum. This is firmly fixed to the horizontal ſurfaces of the bodies of the vertebræ, and therefore not only allows theſe bones to recede from each other, and to be preſt cloſer together without breaking, but ſerves to connect them, in which it is aſſiſted by a ſtrong membranous ligament, which lines all their concave ſurface, and by ſtill a ſtronger ligament that covers all their anterior convex ſurface. It may be obſerved, as a general rule, notwithſtanding ſome exceptions, that the bodies of the vertebræ are ſmaller and more ſolid above, but as we reckon downwards, appear larger and more ſpungy, and that the cartilages between them are thick, and the ſurrounding ligaments ſtrong in proportion to the largeneſs of the vertebræ, and the quantity of motion they are to perform; by which diſpoſition the greater weight is ſupported on the broadeſt beſt ſecured baſe, and the middle of our body is allowed a large and ſecure motion, which is of conſiderable benefit. From each ſide of the body of each vertebra, a bony bridge is produced backwards and to a ſide; from the poſterior extremity of which, one ſlanting proceſs riſes, and another deſcends; the ſmooth, and what is generally the flatteſt ſide of each of theſe four proceſſes, which are called the oblique, is covered with a ſmooth cartilage, and the two inferior oblique proceſſes of each vertebra are fitted to, and articulated with, the two ſuperior or aſcending oblique proceſſes of the vertebra below. From between the ſuperior and inferior oblique proceſs of each ſide, the vertebra is ſtretched out laterally in form of a proceſs, that is univerſally named tranſverſe. From the poſterior roots of the two oblique, and of the tranſverſe proceſs of each ſide, a broad oblique bony plate is extended backwards; where theſe meet, the ſeventh and laſt proceſs of the vertebræ takes its riſe and ſtands out backwards; this being generally ſharp-pointed, and narrow-edged, has therefore been called ſpinal proceſs, from which this whole chain of bones has got the name ſpina. Beſides the common ligament which lines all the interior ſurface of theſe proceſſes as well as of the bodies, there are particular ligaments that connect the proceſſes of each two contiguous vertebræ. The ſubſtance of the proceſſes is conſiderably ſtronger and firmer than that of the bodies of the vertebræ, having a thicker external plate, and without ſo many large holes in it. The ſeven proceſſes conſidered conjunctly, as forming the poſterior ſhares of the vertebræ, are hollow at their anterior middle part; which concavity, joined with that at the poſterior part of the bodies, makes one great foramen, which anſwers to ſuch another in the vertebræ above and below; therefore the foramina of all the vertebræ taken together, form a long great conduit, which is widened or ſtraitened in proportion to the ſize of the medulla ſpinalis, which it contains. See MEDULLA.

In the lateral bridges, which join the bodies to the proceſſes of each vertebra, a ſemicircular notch is obſervable both above and below; which, exactly correſponding with others in the contiguous

ſiguous bones, when the vertebræ are joined, form a round hole in each ſide, between each two vertebræ, through which the nerves that proceed from the medulla ſpinalis and the blood veſſels paſs. The articulations then of theſe true vertebræ are plainly double; for their bodies are joined by ſynchondroſis, and their oblique proceſſes are articulated by the third ſort of ginglymus. Hence it is evident, that their centre of motion is altered in different poſitions of the trunk. For when we bow forwards the ſuperior moved part bears entirely on the bodies of the vertebræ; if we bend back, the oblique proceſſes ſupport the weight; if we recline to one ſide, we reſt upon the oblique proceſſes of that ſide and part of the bodies; if we ſtand erect, all the bodies and oblique proceſſes have their ſhare in our ſupport. See ARTICULATION.

There are in all twenty-four vertebræ: the neck conſiſts of ſeven; and in theſe, as in the others, we are to obſerve ſome things in general; and afterwards, other things in particular. The vertebræ of the neck are ſmaller than thoſe of the back; but they are of a firmer conſiſtence, and harder: their body is more compreſſed than in the others, and is ſinuated on the upper part, and convex below. Moſt of theſe vertebræ have nine apophyſes; the tranſverſe and poſterior ones, called the ſpinoſe apophyſes, are uſually bifurcated: the tranſverſe ones are perforated alſo, for the paſſage of the vertebral veſſels to the head. In the conſideration of the vertebræ of the neck ſingly, we are to obſerve, that the upper one has a peculiar name: it is called atlas. This wants the body and the ſpinoſe apophyſes, and approaches to the figure of a ring: its ſubſtance is more ſolid than that of any other, and it receives both above and below; but it is not received itſelf. The head is articulated at is interior part, and it is by means of this articulation that the head is bent, and extended. The proper foramen is greater in this than in any other vertebra, which ariſes from its wanting the body: the tranverſe proceſſes are alſo longer than in the others. It has alſo a peculiar ſemi-circular ligament, by which it embraces the dentiform proceſs of the ſucceeding vertebra. The ſecond vertebra is called epiſtrophæus, and axis; in which we are to obſerve the dentiform or odontoide proceſs, juſt mentioned; whereby it articulates in the manner of an hinge, with the firſt vertebra, and the rotatory motion of the head is performed by means of it. The third vertebra is alſo called axis by ſome, though it has nothing to warrant ſuch a name; for there is nothing particular to be obſerved in this, or any of the ſucceeding vertebræ of the neck, more than has been already taken notice of them in general. The dorſum, or back, has twelve vertebræ; of which we may remark in general, that they are of a middle ſize between thoſe of the neck, and thoſe of the loins: their ſpinoſe apophyſes are alſo very long, and, except in the two laſt, very much inclinated: the cartilages between the bodies of theſe, are ſmaller than thoſe of the neck: the two tranſverſe apophyſes are thick, and have a depreſſion in them for the articulation with the ribs. The firſt vertebra of the back is called the axillary, or eminent vertebra; and to it is joined the upper rib. See RIBS.

The vertebræ of the loins are five; of which we may obſerve in general, that their bodies, and alſo the intervening cartilages, are very thick; the tranſverſe apophyſes very long, but ſmaller than thoſe of the back; the ſpinoſe apophyſes are thick, ſtraight, and ſet farther aſunder than in the others, to give way to a laxer motion in this part.

Some have given particular names to the vertebræ of the back and loins; but this is not neceſſary, as they are ſufficiently diſtinguiſhed by numbering them. For the luxations, fractures, and other injuries of the vertebræ, ſee the articles SPINE, RIBS, LUXATION, &c.

VERTEX, in anatomy, denotes the crown of the head, or the uppermoſt part ſituated between the ſinciput and occiput. See the article HEAD.

Hence vertex is alſo uſed, figuratively, for the top of other things: thus, the vertex of a cone, pyramid, &c. is the top of any one of theſe figures. See CONE, &c.

The vertex of an angle is the angular point; and thoſe angles, which, being oppoſite to one another, do touch only in the angular point, are called vertical angles: ſuch are the angles A B C and D B E (plate CCXC. fig. 5.) wherein the ſides A B and C B of one of them are only continuations of the legs of the other, B E and B D; and ſuch angles are demonſtrated to be equal.

The vertex of any plane figure, is the

angle oppoſite to the baſe; and the vertex of a curve, is the point from which the diameter is drawn, or the interſection of the diameter and curve.

VERTEX *of a glaſs*, in optics, the ſame with the pole thereof.

VERTEX, is alſo uſed, in aſtronomy, for the point of heaven perpendicularly over our heads, properly called the zenith. See ZENITH.

Path of the VERTEX, the circle deſcribed by the vertical point during one revolution of the earth about its axis.

VERTICAL CIRCLE, in aſtronomy, a great circle of the ſphere paſſing through the zenith and nadir, and cutting the horizon at right angles: it is otherwiſe called azimuth. See AZIMUTH.

Prime VERTICAL, is that vertical circle or azimuth which paſſes throug the poles of the meridian; or which is perpendicular to the meridian, and paſſes through the equinoctial points. See AZIMUTH.

VERTICAL *of the ſun*, is the vertical which paſſes through the center of the ſun at any moment of time.

VERTICAL PLANE, in perſpective, is a plane perpendicular to the geometrical plane, paſſing through the eye, and cutting the perſpective plane at right angles.

VERTICAL PLANE, in conics, is a plane paſſing through the vertex of the cone, and parallel to any conic ſection. See PLANE.

VERTICAL LINE, in conics, is a right line drawn on the vertical plane, and paſſing through the vertex of the cones. See LINE.

VERTICAL DIAL, is a ſun-dial drawn on the plane of a vertical circle, or perpendicular to the horizon. See DIAL.

VERTICAL POINT, in aſtronomy, the ſame with vertex or zenith.

VERTICILLATE PLANTS, are ſuch as have their flowers intermixed with ſmall leaves growing in a kind of whirls about the joints of a ſtalk; as penny-royal, hore-hound, *&c.* See PLANT.

The peculiar characteriſtic of this genus of plants, according to Mr. Ray, is, that their leaves grow in pairs, one juſt againſt another, on the ſtalk; the flower is monopetalous, but uſually grows down with a kind of lip, or turning, ſomething like the form of a helmet; there are four ſeeds after each flower, to which the perianthium of the flower ſerves inſtead of a capſula ſeminalis.

VERTICITY, is that property of the loadſtone, whereby it turns, or directs itſelf to ſome peculiar point. See MAGNET.

VERTIGO, in medicine, a diſeaſe in which the head ſeems to turn round.

This, according to Dr. Willis, is a diſorder in which viſible objects ſeem continually to turn round, whilſt the patients are affected with a perturbation or confuſion of the animal ſpirits in the brain, which hinders their influx into the nerves. Hence it is, that the viſive and locomotive faculties often fail to ſuch a degree, that the patient is ready to drop down, and complains of darkneſs. Etmuller divides it into three kinds; the firſt of which is a ſimple vertigo, in which there is only a tranſient and ſhort-continued gyration of objects. The ſecond is a dark vertigo, or ſcotomia, when the eyes are darkened, or ſo affected, as if ſeveral colours were before them. And the third is the vertigo caduca, in which the patient preſently falls down.

A vertigo may be produced by every cauſe which can diſtend, preſs, or contract the arteries; ſuch as ſudden fear, ſurprize, ebriety, and voracity, by which the regular influx and reflux of the animal ſpirits into the optic nerves and retina are prevented. Sometimes, alſo, it may be produced by an acid, or any peccant humour, lodged in the ſtomach, and vellicating its nerves, which communicate with the retina; for which reaſon the hypochondriac and hyſteric paſſions may produce a vertigo.

With reſpect to the cure, the regimen in general, ought to be the ſame with that in the apoplexy or epilepſy. If the patient is plethoric, a due quantity of blood is to be taken away; and if a naufea, loſs of appetite, or any other diſorder of the ſtomach remain, an emetic is to be preſcribed; then cathartics and ſpecifics are to be ordered. According to Mayerne, calamus aromaticus, in whatever form, is good for a vertigo, and eſteemed a ſecret for that diſorder. The ſame author informs us, that a german phyſician cured a great many of vertigoes, by pills made of ſugar of lead and cypreſs-turpentine; four or five grains of which were to be taken for a doſe, and their uſe perſiſted in for ſome days. Gliſſon, as Bates informs us, after all other medicines had failed, was cured of a ſevere vertigo, of three weeks continuance, by ſhaving his head, and applying to it a plaiſter of the flowers of ſulphur and whites of eggs. Some order a cauſtic, or a ſeton, to be applied to the back part of the neck;

neck; a cautery to the bregma, and Bates's epileptic electuary, or Fuller's peruvian epileptic electuary, to be uſed internally.

Willis informs us, that after he had in vain tried all other medicines, he, with ſucceſs, preſcribed the following powder: Take of the powder of the roots of male piony, two ounces; of the flowers of male piony, one ounce; of peacocks dung, of the whiteſt kind, half a pound; and of white ſugar, two ounces: reduce to a powder, the doſe of which is to be about the quantity of a ſpoonful twice a day, drinking after it a draught of a decoction of ſage and roſemary, impregnated with coffee.

Heiſter orders camphorated ſpirit of wine alone, or mixed with ſpirit of hartſhorn, to be applied to the top of the head and temples. And when the diſorder proceeds from crudities in the ſtomach, he adviſes to prepare and diſſolve them by neutral ſalts, that they may be afterwards evacuated by an emetic, or purge. After this, the patient ſhould uſe ſtomachics and cephalics; as alſo a moderate quantity of wine at meals, which ſhould be ſparing. Pyrmont-water is alſo ſaid to be excellent in this caſe.

VERVAIN, *verbena*, in botany. See the article VERBENA.

VERUE, a town of Piedmont, ſituated on the river Po, twenty miles north-eaſt of Turin.

VERU-MONTANUM, in anatomy, a kind of little valve, in the place wherein the ejaculatory ducts enter the urethra.

Its uſe is to prevent the urine, in paſſing the urethra, from getting in at theſe ducts, and ſo mixing with the ſemen.

VERY LORD, and VERY TENANT, are thoſe that are immediate lord and tenant to one another. See LORD.

VESICA, in anatomy, a bladder, a membranous or ſkinny part in which any humour is contained. See BLADDER.

VESICARIA, in botany, is comprehended under the alyſſum of Linnæus. See the article ALYSSON.

VESICATORY, *veſicatorium*, an external medicine, ſerving to raiſe a bliſter; whence, alſo, it is itſelf, though improperly, called a bliſter.

Veſicatories are unguents, cataplaſms, or plaſters, made of ſharp irritating medicines, which have a faculty of drawing the humors from within, outwards, inflaming and ulcerating the ſkin, and raiſing veſicæ or bladders, whence their denomination veſicatory.

We have veſicatories made of cantharides, euphorbium, figs, ſublimate of mercury, lapis infernalis, muſtard, anacardium, ſquills, briony, vinegar, pepper, leaven, *&c.* which are incorporated and made up with honey, gums, reſins, *&c.* to bring them to the conſiſtence required.

VESICULA, VESICLE, a diminutive of veſica, ſignifying a little bladder.

The lungs conſiſt of veſiculæ, or lobules of veſiculæ, admitting air from the bronchia; and not only air, but alſo duſt, *&c.* There are ſeveral other parts in the body which bear this appellation; as the veſicula fellis, or gall-bladder, veſiculæ ſeminales, *&c.* See GALL, *&c.*

VESPA, the WASP, in zoology. See WASP.

VESPER, or HESPER, in aſtronomy. See the article HESPER.

VESPERS, in the church of Rome, denote the afternoon ſervice, anſwering, in ſome meaſure, to the evening prayers of the church of England. See PRAYER and SERVICE.

VESPERTILIO, the BAT, in zoology, a genus of quadrupeds, of the order of the feræ, the characters of which are theſe: the fore-teeth of the upper jaw are ſix in number, acute, and diſtant from each other; the fore-teeth of the lower jaw are alſo ſix, and acute, but contiguous: the the canine teeth are two both above and below, on each ſide: the feet have each five toes; and the fore-feet have the toes connected by a membrane, and expanded into a ſort of wings, whereby it flies; whence this animal has been generally, but with the utmoſt impropriety, ranged among the birds.

The common bat is about the bigneſs of a mouſe, and very much reſembles it in ſhape and colour. There are ſeveral other ſpecies of this creature, ſome with, and others without, a tail.

VESPERTILIONUM ALÆ, BATS-WINGS in anatomy, a name given to the two broad ligaments which connect the bottom of the uterus to the bones of the ilium. See the article UTERUS.

VESPRIN, a town of lower Hungary, fifty miles ſouth-weſt of Buda.

VESSEL, *vas*, denotes in general any thing for holding liquors: ſuch are our domeſtic cups, pots, *&c.* as alſo the retorts, matraſſes, crucibles, *&c.* of the chemiſts. See RETORT, LABORATORY, *&c.*

In anatomy, all the parts which contain or convey a fluid, are called veſſels; as the veins, arteries, lymphatics, *&c.* See the articles VEIN, ARTERY, *&c.*

Some

Some alſo extend the word veſſel to the nerves, as ſuppoſing them the conduits of the animal ſpirits. See NERVE and ANIMAL SPIRITS.

VESSEL, in navigation, a general name for all ſorts of ſhips. See the article SHIP.

VESTALIA, in roman antiquity, a feſtival celebrated in honour of the goddeſs Veſta, on the fifth of the ides of June; that is, on the ninth of that month.

VESTALS, *veſtales*, among the antient Romans, were prieſteſſes of the goddeſs Veſta, and had the perpetual fire committed to their charge: they were at firſt only four in number, but afterwards increaſed to ſix; and it does not appear, that their number ever exceeded ſix, among whom one was ſuperior to the reſt, and called *veſtalis maxima*.

The veſtals were choſen from ſix to ten years of age, and obliged to ſtrict continency for thirty years; the firſt ten of which were employed in learning the ceremonies of religion, the next ten in the performance of them, and the ten laſt in teaching them to the younger veſtals.

The habit of the veſtals conſiſted of an head-dreſs, called infula, which ſat cloſe to their heads, and from whence hung certain laces called vittæ; a kind of ſurplice made of white linnen, and over it a purple mantle with a long train to it.

VESTIBLE, *veſtibulum*, in architecture, a kind of entrance into a large building; being an open place before the hall, or at the bottom of the ſtair-caſe. Veſtibles, intended for magnificence, are uſually between the court and the garden.

The Romans had veſtibles at the entrance of their houſes, for ſheltering thoſe perſons who were obliged to ſtand at the door; and we have now veſtibles of a like kind in many old churches, houſes, &c. uſually called porches. See the article PORCH.

The term veſtible is ſometimes alſo uſed for a little anti-chamber, before the entrance of an ordinary apartment.

VESTIBLE *of the ear*, in anatomy, a cavity forming the middle part of the labyrinth of the ear. See EAR.

VESTIGIA, a latin term frequently uſed, by engliſh writers, for the traces or footſteps which any thing has left behind it.

VESTRY, a place adjoining to a church, where the veſtments of the miniſter are kept; and alſo a meeting at ſuch place, conſiſting of the miniſter, church-wardens, and chief men of moſt pariſhes, who make a pariſh veſtry or meeting. By cuſtom there are ſelect veſtries, being a certain number of perſons choſen to have the government of the pariſh, make rates, and take the accounts of church-wardens, &c. And it is here to be obſerved, that when any rates are made, the pariſhioners muſt have notice of a veſtry held for that purpoſe; in which caſe all that are abſent ſhall be concluded by a majority of the pariſhioners preſent, who in conſtruction of law are the whole pariſh. Veſtries of pariſhes are to be conſulted by pariſh-officers; and if a pariſhioner, who has a right to be preſent and vote at a veſtry, be ſhut out of the veſtry-room, action of the caſe lies.

VESTURE, or INVESTITURE, in law. See the article INVESTITURE.

VESUVIUS, a famous vulcano, or burning mountain, ſituated only ſix miles eaſt of the city of Naples, in Italy. See the article VULCANO.

VETCH, *vicia*, in botany, a genus of the *diadelphia-decandria* claſs of plants, with a papilionaceous flower; and its fruit is a long, bivalve, and coriaceous pod, containing ſeveral roundiſh ſeeds.

VETCH alſo makes part of the names of other plants; as the bitter vetch, horſeſhoe vetch, &c. See the articles OROBUS and HIPPOCREPIS.

VETERAN, among the antient Romans, an appellation given to a ſoldier who was grown old in the ſervice, or had made a certain number of campaigns.

VETERNUS, or LETHARGY, in medicine. See the article LETHARGY.

VETITUM NAMIUM, in law, imports a forbidden diſtreſs; ſuch, *e. gr.* is that when the bailiff of a lord diſtrains beaſts or goods, and the lord forbids his bailiff to deliver them when the ſheriff comes to replevy them, and to that end drives them to places unknown.

VEXES, or *Ne injuſte* VEXES, in law. See the article NE INJUSTE.

VIA-LACTEA, in aſtronomy, the milky-way, or galaxy. See GALAXY.

VIA-SOLIS, *the ſun's way*, in aſtronomy, is uſed, among ſome aſtronomers, for the ecliptic line, ſo called, becauſe the ſun never goes out of it. See ECLIPTIC.

VIÆ PRIMÆ, firſt paſſages, among phyſicians, are the œſophagus, ſtomach, and guts; including the whole length of the alimentary duct, or canal, from the mouth of the ſphincter ani.

VIALES, in mythology, a name given among the Romans to the gods who had the

the care and guard of the roads and highways.

The dii viales, according to Labeo, were of the number of thoſe gods called dii animales, who were ſuppoſed to be the ſouls of men changed into gods; and were of two kinds, *viz.* the viales and penates. See LARES.

VIANA, a town of Navarre, in Spain, ſituated on the river Ebro, forty-ſix miles ſouth-weſt of Pampeluna.

VIANA is alſo a port-town of Portugal, thirty-ſix miles north of Oporto.

VIANDEN, a town of Luxemburg, twenty miles north of the city of Luxemburg.

VIATICUM, in the church of Rome, an appellation given to the euchariſt, when adminiſtered to perſons at the point of death. See the article EUCHARIST.

VIATOR, in roman antiquity, an appellation given in common to all officers of any of the magiſtrates; as lictors, accenſi, ſcribes, cryers, *&c.* See the article LICTOR, *&c.*

VIBEX, is ſometimes uſed, by phyſicians, for a black and blue ſpot in the ſkin, occaſioned by an afflux or extravaſation of blood.

VIBRATION, in mechanics, a regular, reciprocal motion of a body, as a pendulum, *&c.* which, being freely ſuſpended, ſwings or oſcillates, firſt this way, then that. See the article PENDULUM.

VIBRATION is alſo uſed, in phyſics, for divers other regular alternate motions: thus ſenſation is ſuppoſed to be performed, by means of the vibratory motion of the nerves, begun by external objects, and propagated to the brain.

VIBURNUM, in botany, a genus of the *pentandria-trigynia* claſs of plants, with a monopetalous, campanulated flower, ſemiquinquifid at the limb: the fruit is a roundiſh unilocular berry, containing a ſingle, oſſeous, compreſſed, and ſtriated ſeed.

This genus comprehends the tinus, or lauruſtine; the opulus, or water-elder; and the viburnum of authors, called in engliſh the way-faring-tree.

VICAR, *vicarius*, a perſon appointed, as deputy to another, to perform his functions in his abſence, and under his authority.

VICAR, in the canon law, denotes a prieſt of a pariſh, the predial tithes whereof are impropriated or appropriated; that is, belong either to a chapter, religious houſe, *&c.* or to a layman, who receives them, and only allows the vicar the ſmall tithes or a convenient ſalary, anciently called portio congrua.

VICAR-GENERAL, was a title given by king Henry VIII. to Thomas Cromwell, earl of Eſſex, with full power to overſee the clergy, and regulate all matters relating to church affairs.

VICE, *vitium*, in ethics, is ordinarily defined an elective habit, deviating, either in exceſs, or defect, from the juſt medium wherein virtue is placed. See the articles HABIT, VIRTUE, *&c.*

VICE, in ſmithery, and other arts employed in metals, is a machine, or inſtrument, ſerving to hold faſt any thing they are at work upon, whether it is to be filed, bent, rivetted, *&c.* To file ſquare, it is abſolutely neceſſary that the vice be placed perpendicular with its chaps parallel to the work-bench.

Hand VICE, is a ſmall kind of vice ſerving to hold the leſſer works in, that require often turning about.

Of theſe there are two kinds, the broad-chapped hand-vice, which is that commonly uſed; and the ſquare-noſed hand-vice, ſeldom uſed but for filing ſmall round work. See SMITHERY.

VICE is alſo a machine uſed by the glaziers to turn or draw lead into flat rods, with grooves on each ſide to receive the edges of the glaſs.

VICE is alſo uſed, in the compoſition of divers words, to denote the relation of ſomething that comes inſtead, or in the place, of another; as vice-admiral, vice-chancellor, vice-chamberlain, vice-preſident, *&c.* are officers who take place in the abſence of admirals, *&c.* See the articles ADMIRAL, CHANCELLOR, *&c.*

VICE-ROY, a governor of a kingdom, who commands in the name and ſtead of a king, with full and ſovereign authority. See the article KING.

VICE VERSA, a latin phraſe, importing on the contrary: thus, as the ſun mounts higher and higher above the horizon, the ſhadows of things decreaſe; and *vice verſa*, as he deſcends lower, they increaſe.

VICH, a town of Catalonia, in Spain, thirty miles north of Barcelona.

VICIA, the VETCH, in botany. See the article VETCH.

VICISSITUDE, the regular ſucceſſion of one thing after another; as the viciſſitude of day and night, of the ſeaſons, *&c.*

VICOVARO, a town of Italy, forty miles north-eaſt of Rome.

VICOUNT, in old law-books, ſignifies the ſame with ſheriff. See SHERIFF.

VICOUNT, or VISCOUNT, is alſo a degree of nobility next below a count, or earl, and above a baron. See NOBILITY, EARL, *&c.*

VICOUNTIEL, in law-books, ſomething belonging to, or falling within the ſheriff's juriſdiction: thus writs vicountiels are writs triable in the ſheriff's court; and there are certain vicountiel rents, whereof the ſheriff keeps a particular roll, that uſually comes under the title of firma comitatus.

Alſo vicountiel juriſdiction, is that which belongs to officers of a county; as ſheriff, coroner, eſcheator, *&c.* See the article SHERIFF, *&c.*

VICTIM, *victima*, denotes a bloody ſacrifice offered to ſome deity, of a living creature, as a man or beaſt, which is ſlain to appeaſe his wrath, or obtain ſome favour. See the article SACRIFICE.

VICTORIA, or VITORIA, a town of the province of Biſcay, in Spain, thirty miles ſouth of Bilboa.

VICTORY, *victoria*, the overthrow or defeat of an enemy, in war or combat.

VICTUALS, ſignifies any ſuſtenance, or things neceſſary to live upon, as meat and proviſions; which are to be ſold at a reaſonable price, aſſeſſed by juſtices, *&c.* on pain of forfeiting double the value. By the cuſtom of ſome manors, they chooſe yearly ſurveyors of victuals. See the article ASSISE.

VICTUALLING-OFFICE, for the navy. See the article OFFICE.

VIDAMES, certain officers under the biſhops of France, for the adminiſtration of juſtice, and preſervation of the temporalities of the biſhoprics.

VIDIN, or WIDIN, a town of european Turky, in the province of Servia, ſituated on the river Danube, in eaſt long. 24°, and north lat. 43° 50′.

VIENNA, the capital city of the circle of Auſtria and of the german empire, is ſituated on the Danube, in eaſt long. 16° 20′, and north lat. 48° 20′.

Vienna is an archbiſhop's ſee, and has a celebrated univerſity.

VIENNE, a town of Dauphine, in France, ſituated on the river Rhone, eighteen miles ſouth of Lyons. It is an archbiſhop's ſee.

VI ET ARMIS, in law, are words made uſe of in indictments and actions of treſpaſs, to ſhew the violent commiſſion of any treſpaſs or crime; but in an appeal of death, or where a perſon is killed with a weapon, theſe words are not held neceſſary, becauſe the violence is implied.

VIEW, in law, ſignifies the particular act of viewers; as where a real action is brought, and the tenant does not certainly know what land it is the defendant requires; then he may pray that the jury may view the ſame, that is to ſay, ſee the land that is claimed. But it is held, that in all caſes of viewing, the thing in controverſy is only to be ſhewn to the jurors, and no evidence can be given relating to it on either ſide: and here if waſte be alledged to be done in every room of a houſe, the view of the houſe generally is ſufficient.

VIEW *of frank pledge*, is the office which the ſheriff in his county-court, the ſteward in the leet, or the bailiff in his hundred, performs in looking to the king's peace, and ſeeing that every man be in ſome pledge.

VIGEVANO, a town of the dutchy of Milan, in Italy, ſixteen miles ſouth-weſt of Milan.

VIGILS, in church-hiſtory, are the faſts appointed before certain feſtivals, in order to prepare the mind for a due obſervation of the enſuing ſolemnity.

VIGINTIVIRATE, a tribunal or court among the antient Romans, firſt eſtabliſhed by Cæſar, conſiſting of twenty members, three of whom judged of all criminal matters; three others had the inſpection of the coins; four others had the inſpection of the ſtreets of Rome; and the reſt were judges of civil affairs.

VIGNAMONT, a town of the biſhopric of Liege, in Germany, two miles north of Huy.

VIGO, a port-town of Galicia, in Spain, ſeventy miles ſouth-eaſt of cape Finiſterre: weſt long. 9° 18′, north lat. 42° 15′.

VILLA-BOHIM, a town of Portugal, ten miles ſouth-weſt of Elvas.

VILLA-FRANCA, the name of ſeveral towns, one in Piedmont, three miles eaſt of Nice; another of Catalonia, eighteen miles weſt of Barcelona; a third, the capital of St. Michael, one of the Azores; and a fourth, a town of Eſtremadura, in Spain, fifty-four miles ſouth eaſt of Salamanca.

VILLA-FRANCHE, a town of Orleanois, in France, twelve miles north of Lyons.

VILLACH, a town of Carinthia, in Germany, twenty miles weſt of Clagenfurt.

VILLAGE, an aſſemblage of houſes, inhabited chiefly by peaſants and farmers, and

and having no market, whereby it is diſtinguiſhed from a town. See the articles CITY and TOWN.

Fleta tells us, that the difference made between a manſion, a village, and a manor, is this, *viz.* a manſion may conſiſt of one or more houſes, but muſt be of one dwelling place, and none near it; for if other houſes are contiguous, it is then a village; and a manor conſiſts of ſeveral villages, or of one alone.

Where in legal proceedings a place is named generally, it ſhall be taken for a vill, becauſe as to civil purpoſes the kingdom was firſt divided into vills; yet it has been held, that a vill and a pariſh ſhall be intended the ſame.

VILLAIN, or VILLEIN, *villanus*, in our antient cuſtoms, denotes a man of ſervile and baſe condition, *viz.* a bondman or ſervant: and there were antiently two ſorts of bondmen or villains in England; the one termed a villain in gro's, who was immediately bound to the perſon of his lord and his heirs; the other a villain regardant to a manor, he being bound to his lord as a member belonging and annexed to the manor whereof the lord was owner; and he was properly a pure villain, of whom the lord took redemption to marry his daughter, and to make him free; and whom the lord might put out of his lands and tenements, goods and chattles at his will, and beat and chaſtiſe, but not maim him.

VILLA REAL, the name of two towns, the one in Spain, thirty miles north of Valencia; and the other in Portugal, fifty miles eaſt of Porto.

VILLA DEL REY, a town of Spain, ten miles north of Badajox.

VILLA RICA, a port-town of Mexico, ſituated on the gulph of Mexico, in weſt long. 100°, and north lat. 20°.

VILLA VICIOSA, the name of two towns of Spain, one forty-ſeven miles north-eaſt of Madrid; and the other a port-town of Aſturias, twenty-two miles north-eaſt of Oviedo: weſt long. 6° 6′, north lat. 43°.

VILLENA, a town of New Caſtile, in Spain, forty miles north of Murcia: weſt long. 1° 15′, north lat. 38° 46′.

VILLENAGE, a kind of antient tenure, whereby the tenant was bound to do ſuch ſervices as the lord commanded, or ſuch as were fit for villains or bondmen to perform.

VILLENOUS, or VILLAINOUS JUDGMENT, in law, that which degrades and caſts ſhame and reproach upon the offender; ſo that he ſhall not be of any credit afterwards, nor ſhall it be lawful for him to approach the king's court, *&c.*

VILLI, among botaniſts, a kind of down, like coarſe hair, or the grain or ſhag of pluſh, with which ſome trees abound.

VILLOSE, or VILLOUS, ſomething abounding with villi, or fibres like coarſe hairs: ſuch is one of the coats of the ſtomach. See the article STOMACH.

VILVORDE, a town of Brabant ſeven miles north of Bruſſels.

VINALIA, in roman antiquity, a feſtival on the ninth of the calends of May, in honour both of Jupiter and Venus.

VINCA, the PERIWINKLE, in botany, a genus of the *pentandria monogynia* claſs of plants, the flower of which conſiſts of a ſingle ſaucer-like petal, with an horizontal limb, divided into five ſegments: the pericarpium conſiſts of two erect, cylindric, and long follicles, formed of one valve, and opening longitudinally: the ſeeds are numerous, oblong, cylindric, and ſulcated.

Cape VINCENT, the moſt ſouth-weſt promontory of Portugal: weſt long. 10°, and north lat. 36° 53′.

St. VINCENT, one of the Caribbee-iſlands, ſeventy-five miles weſt of Barbadoes.

St. VINCENT, is alſo a province of Brazil, bounded by the Rio Janiero on the north, by the Atlantic on the eaſt, by the province of del Rey on the ſouth, and by that of the ſpaniſh La Plata on the weſt.

VINCETOXICUM, in botany, the ſame with the aſclepias, or ſwallow-wort. See the article ASCLEPIAS.

The root of this plant is eſteemed ſudorific, emmenagogue, and is frequently preſcribed as an alexipharmic, eſpecially among the Germans: it appears to poſſeſs much the ſame medicinal virtues with valerian, only that this laſt is indiſputably preferable to it. See VALERIAN.

VINCULUM, in mathematics, a character in form of a line, or ſtroke, drawn over a factor, diviſor, or dividend, when compounded of ſeveral letters or quantities, to connect them, and ſhew they are to be multiplied, or divided, *&c.* together by the other term. Thus $d \times \overline{a+b-c}$ ſhews that d is to be multiplied into $a+b-c$.

VINDEMIATING, the gathering of the grapes, or other ripe fruits, as the apples, pears, cherries, *&c.* See VINTAGE.

VINDEMIATRIX, or VINDEMIATOR, a fixed ſtar of the third magnitude in the coſtellation virgo, whoſe latitude is

16° 12′ 34″ north, and longitude 5° 37 40″ of libra, according to Mr. Flamſteed's catalogue.

VINDICATION, or CLAIMING, in the civil law, an action ariſing from the property a perſon has in any thing; or a permiſſion to take or ſeize a thing, as one's own, out of the hands of a perſon, whom the law has doomed not to be the true proprietor.

VINE, *vitis*, a noble plant or ſhrub of the creeping kind, famous for its fruit, or grapes, and for the liquor they afford. See the article WINE.

The vine conſtitutes a genus of the *pentandria-monogynia* claſs of plants, the flower of which conſiſts of five ſmall, deciduous, and rude petals, growing together at their extremities; and its fruit is a large roundiſh berry, containing five oſſeous, ſemiorbicular, and turbinato-cordated ſeeds, narrow at the baſe.

Our gardeners find, that vines are capable of being cultivated in England, ſo as to produce large quantities of grapes; and thoſe ripened to ſuch a degree, as may afford a good ſubſtantial vinous juice. Witneſs the vineyards in Somerſetſhire; particularly that famous one at Bath. In effect, it does not ſeem ſo much owing to the inclemency of our engliſh air, that our grapes are generally inferior to thoſe of France, as to the want of a juſt culture. Thoſe fitted for the engliſh climate, Mr. Mortimer finds to be the black grape, the white muſcadine, parſley-grape, muſcadilla, white and red frontigniac. Mr. Bradley recommends the July-grape, the early ſweet water grape, lately brought from the Canaries, and the Arbois, or french ſweet water grape: all which, if well managed, and the weather favourable, are ripe by the middle of Auguſt. He alſo recommends the claret and burgundy-grapes.

Vines are propagated either by layers, or cuttings; that is, either by laying down the young branches, as ſoon as the fruit is gathered, or by making plantations of ſlips, or cuttings, at that time. Mr. Mortimer ſays, it may be done any time in the winter before January; though Bradley ſays, he has done it, with ſucceſs, in March and April.

For the beſt ſoil for vines, and the method of cultivating them, ſee the article VINEYARD.

VINEGAR, *acetum*, an acid penetrating liquor, prepared from wine, cyder, beer, &c. of conſiderable uſe both as a medicine and ſauce. See the articles WINE CYDER, &c.

The proceſs of turning vegetable matters to vinegar, is thus delivered by Dr. Shaw: take the ſkins of raiſins, after they have been uſed in making wine; and pour three or four times their own quantity of boiling water upon them, ſo as to make a thin aqueous mixture. Then ſet the containing caſk, looſely covered, in a warmer place than is uſed for vinous fermentation; and the liquor, in a few weeks time, will become a clear and ſound vinegar; which being drawn off from its ſediment, and preſerved in another caſk, well ſtopped down, will continue perfect, and fit for uſe.

This experiment ſhews us a cheap and ready way of making vinegar from refuſe materials; ſuch as the huſks of grapes, decayed raiſins, the lees of wine, grounds of ale, beer, &c. which are frequently thrown away as uſeleſs. Thus, in many wine countries, the marc, rape, or dry preſſing of grapes are thrown in heaps, and ſuffered to putrify unregarded; though capable of affording as good vinegar, as the wine itſelf. In ſome places they bury copper-plates in theſe huſks, in order to make verdigreaſe; but this practice ſeems chiefly confined to the ſouthern parts of France. Our preſent experiment ſhews us how to convert them to another uſe; and the direction extends to all the matters that have once undergone, or are fit to undergo, a vinous fermentation, for that all ſuch matters will afford vinegar. Thus all our ſummer-fruits in England, even blackberries; all the refuſe waſhings of a ſugar-houſe, cyder-preſſings, or the like, will make vinegar, by means of water, the open air, and warmth. See the article VERDEGREASE.

The whole proceſs, whereby this change is effected, deſerves to be attentively conſidered. And, firſt, the liquor to be thus changed, being kept warmer than in vinous fermentation, it, in a few days, begins to grow thick, or turbid; and without throwing up bubbles, or making any conſiderable tumult, as happens in vinous fermentation, depoſits a copious ſediment. The effect of this ſeparation begins to appear firſt on the ſurface of the liquor, which gathers a white ſkin, that daily increaſes in thickneſs, till at length it becomes like leather; and now, if continued longer in this ſtate, the ſkin turns blue, or green, and would at laſt grow

grow ſolid, and putrify: therefore, in keeping down this ſkin as it grows, and thruſting it gently down to the bottom of the veſſel, conſiſts much of the art of vinegar-making, eſpecially from malt. For the difference between vinous and acetous fermentation, ſee the article FERMENTATION.

Method of making Cyder-VINEGAR. The cyder (the meaneſt of which will ſerve the purpoſe) is firſt to be drawn off fine into another veſſel, and a quantity of the muſt, or pouz of apples, to be added: the whole is ſet in the ſun, if there be a conveniency for the purpoſe; and, at a week or nine days end, it may be drawn off. See CYDER.

Method of making Beer-VINEGAR. Take a middling ſort of beer, indifferently well hopped; into which, when it has worked well, and is grown fine, put ſome rape, or huſks of grapes, uſually brought home for that purpoſe: maſh them together in a tub; then, letting the rape ſettle, draw off the liquid part, put it into a caſk, and ſet it in the ſun as hot as may be; the bung being only covered with a tile, or ſlate-ſtone: and in about thirty or forty days, it will become a good vinegar, and may paſs in uſe as well as that made of wine, if it be refined, and kept from turning muſty.

Or thus: to every gallon of ſpring-water, add three pounds of Malaga-raiſins; which put into an earthen jar, and place them where they may have the hotteſt ſun from May till Michaelmas: then, preſſing all well, turn the liquor up in a very ſtrong iron-hooped veſſel, to prevent its burſting: it will appear very thick and muddy, when newly preſſed; but will refine in the veſſel, and be as clear as wine. Thus let it remain untouched for three months, before it be drawn off, and it will prove excellent vinegar.

Method of making Wine-VINEGAR. Any ſort of vinous liquor, being mixed with its own fæces, flowers, or ferment, and its tartar firſt reduced to powder; or elſe with the acid and auſtere ſtalks of the vegetable from whence the wine was obtained, which hold a large proportion of tartar: and the whole being kept frequently ſtirring in a veſſel which has formerly held vinegar, or ſet in a warm place full of the ſteams of the ſame, will begin to ferment a-new, conceive heat, grow ſour by degrees, and ſoon after turn into vinegar.

The remote ſubjects of acetous fermentation are the ſame with thoſe of vinous; but the immediate ſubjects of it are all kinds of vegetable juices, after they have once undergone that fermentation which reduces them to wine: for it is abſolutely impoſſible to make vinegar of muſt, the crude juice of grapes, or other ripe fruits, without the previous aſſiſtance of vinous fermentation.

The proper ferments for this operation, whereby vinegar is prepared, are, 1. The fæces of all acid wines. 2. The lees of vinegar. 3. Pulveriſed tartar; eſpecially that of rheniſh wine, or the cream or cryſtals thereof. 4. Vinegar itſelf. 5. A wooden veſſel, well drenched with vinegar, or one that has been long employed to contain it. 6. Wine that has often been mixed with its own fæces. 7. The twigs of vines, and the ſtalks of grapes, currants, cherries, or other vegetables of an acid auſtere taſte. 8. Bakers-leaven, after it is turned acid. 9. All manner of ferments, compounded of thoſe already mentioned.

The French uſe a method of making vinegar different from that above deſcribed. They take two very large oaken veſſels, the larger the better, open at the top; in each whereof they place a wooden grate, within a foot of the bottom: upon theſe grates, they firſt lay twigs, or cuttings of vines, and afterwards the ſtalks of the branches, without the grapes themſelves, or their ſtones; till the whole pile reaches within a foot of the brim of the veſſels: then they fill one of theſe veſſels with wine to the very top, and half fill the other; and with liquor drawn out of the full veſſel, fill up that which was only half full before; daily repeating the ſame operation, and pouring the liquor back from one veſſel to the other; ſo that each of them is full, and half full, by turns.

When this proceſs has been continued for two or three days, a degree of heat will ariſe in the veſſel, which is then but half full, and increaſe for ſeveral days ſucceſſively, without any appearance of the like in the veſſel which happens to be full during thoſe days; the liquor whereof will ſtill remain cool: and as ſoon as the heat ceaſes in the veſſel that is half full, the vinegar is prepared: which, in the ſummer, happens on the fourteen or fifteenth day from the beginning; but in the winter, the fermentation proceeds much ſlower: ſo that they are obliged

to forward it by artificial warmth, or the uſe of ſtoves.

When the weather is exceeding hot, the liquor ought to be poured off from the full veſſel into the other twice a-day: otherwiſe, the liquor would be overheated, and the fermentation prove too ſtrong; whence the ſpirituous parts would fly away, and leave a vapid wine, inſtead of vinegar, behind.

The full veſſel is always to be left open at the top, but the mouth of the other muſt be cloſed with a cover of wood, in order the better to keep down and fix the ſpirit in the body of the liquor; for otherwiſe, it might eaſily fly off in the heat of fermentation. The veſſel that is only half full ſeems to grow hot, rather than the other, becauſe it contains a much greater quantity of the vine-twigs and ſtalks, than that, in proportion to the liquor; above which the pile, riſing to to a conſiderable height, conceives heat the more, and ſo conveys it to the wine below.

Vinegar is a medicine of excellent uſe in all kinds of inflammatory and putrid diſorders, either internal or external: in ardent, bilious fevers, peſtilential, and other malignant diſtempers, it is recommended by Boerhaave as one of the moſt certain ſudorifics. Weakneſs, fainting, vomiting, hyſterical and hypochondriacal complaints have alſo been frequently relieved by vinegar applied to the mouth and noſe, or received into the ſtomach. Diſtilled vinegar has the ſame virtues, only in a ſtronger degree.

There are alſo medicated vinegars, as vinegar of antimony, of elder, litharge, roſes, ſquills, treacle, *&c.* which derive their chief virtues from vinegar.

VINEYARD, *vinetum*, a plantation of vines. See the article VINE.

The beſt ſituation of a vineyard is on the declivity of an hill, lying to the ſouth. See the article EXPOSURE.

For the planting of a vineyard, obſerve the following method. In the month of July, while the outermoſt coat of the earth is very dry and combuſtible, plough up the ſward; denſhire, or burn beat it, according to art, and in January following, ſpread the aſhes. The ground being thus prepared, cut your trenches acroſs the hill from eaſt to weſt, becauſe the vines being thus in ranks, the riſing and ſetting of the ſun will by that means paſs through the intervals, which it would not do if they were ſet in any other poſition, neither would the ſun dart its rays upon the plants during the whole courſe of the day. See the article PLANTING.

Afterwards ſtrain a line, and dig a trench about a foot deep, place your ſetts in it, about three feet diſtance one from another, trim off the ſuperfluous roots, leaving no more than three or four eyes or buds upon that which is above-ground, and plant them near half a foot deep, ſloping, after the manner the quick is commonly ſet, ſo as they may point up the hill. That done, take long dung or ſtraw, and lay it on the trenches in a convenient thickneſs to cover the earth, and preſerve the roots from the dry piercing winds, which would otherwiſe much annoy them, and from the exceſſive ſcorching heats in ſummer; keep them well hoed, and free from weeds, and water them as occaſion ſerves; the beſt time to plant is in January. See the article MANURE.

The firſt pruning of the new-ſet vine ought not to be till January, and then you ſhould cut off all the ſhoots as near as you can, ſparing but one of the moſt thriving, on which you are to leave only two or three buds, and ſo let all reſt till May, the ſecond year after planting. Then take care from time to time to deſtroy the weeds, and be ſure to clear the roots of all ſuckers, which do but rob and draw out the virtue of your ſets. The ſame method is to be followed the third year; then dig your whole vineyard, and lay it very level; taking care in this operation not to cut or wound any of the main roots with your ſpade. As for the younger roots, it is not ſo material, in regard that they will grow but the thicker; and this year you may enjoy ſome of the fruits of your vineyard, which if anſwerable to your expectation, will put you upon providing props for your vines, of about four feet long, which muſt be placed on the north ſide of the plant. In May, rub off ſuch buds as you ſuſpect will produce ſuperfluous branches. When the grapes are about the bigneſs of birding-ſhot, break off the branches with your hand at the ſecond joint above the fruit, and tie the reſt to the prop: here it is moſt adviſeable to break, and not cut your vine; becauſe wounds made with a ſharp inſtrument are not apt to heal, but cauſe the plants to bleed. See the articles PRUNING, LOPPING, *&c.*

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The fourth year you will be likely to have three or four ſhoots to every plant: and therefore, in December, cut off all the branches except one of the ſtrongeſt and moſt thriving, which leave for a ſtandard about four feet high, paring away the reſt very cloſe to the body of the mother-plant, which tie to your prop till it be big enough to make a ſtandard of itſelf. Neither muſt you ſuffer any ſhoot to break out but ſuch as ſprout at the top, four feet from the ground, all which ſprouts the French uſually prune off every year, and abſolutely truſt to the new ſprouts that are only bearing ſhoots.

In Auguſt, when the fruit begins to ripen, break off ſuch ſhoots as you find too thick; and if you perceive any plant bleed, rub ſome aſhes on it; or, if that will not do, ſear it with a hot iron. When upon ſtirring your vineyard it appears to be poor, prune the vines as before directed, and ſpread good dung, mixed with lime, over the whole ground, letting it lie all the winter to waſh into the earth, mixing about ten buſhels of lime with a load of dung, and if ſome aſhes and ſoot be likewiſe thrown on, it will do well. Turn in this manure, about February, with a ſlight digging, but not too deep, which ſhould be done in a dry ſeaſon, and not in wet weather, leſt it make the ground bind too much and occaſion the growth of rank weeds. But to forward the ripening of grapes, and render them fruitful, the blood of beaſts mixed with lime or ſoot, is very proper; laying it to the roots of the vines in December and July; and if the ſeaſon be very dry, the watering them in Auguſt is a great advantage. See the article DUNGING.

As to the ſoil of a vineyard, it is agreed that nothing can be too dry for it; and as to the ſorts of vines, none but the forward ones ought to be planted in England.

VINOUS, *vinoſus*, ſomething that relates to wine, or that has the taſte and ſmell thereof. See the article WINE.

All vegetables, by a due treatment, afford a vinous liquor, as corn, pulſe, nuts, apples, grapes, *&c.* A ſecond fermentation, duly managed, turns any vinous liquor into an acetous one. The proper character and effect of fermentation are to produce either a vinous or an acetous quality in the body fermented. See the article FERMENTATION.

VINTAGE, a crop of wine, or what is got from the vines each ſeaſon. See VINE, VINEYARD, and WINE.

The word is alſo uſed for the time or ſeaſon of gathering or preſſing the grapes. See GRAPES and *Wine*-PRESS.

VINTIMIGLIA, a port town of Italy, in the territory of Genoa, ſituated on the Mediterranean, ſeventeen miles eaſt of Nice, and one hundred ſouth-weſt of Genoa-city.

VINUM, a liquor or drink, commonly called wine. See WINE.

VINUM, in medicine, *vinum medicatum*, is particularly applied to ſeveral medicated wines, that is, medicinal preparations, whereof wine is the baſis. The original intention of medicated wines, was for exhilirating medicines, which were to be continued for a length of time in the moſt familiar and agreeable form: by this means a courſe of remedies was complied with, notwithſtanding the repugnance and averſion which the ſick often manifeſt to thoſe directly furniſhed from the ſhops; and hence the inferior ſort of people had their medicated ales. Nevertheleſs, as vinous liquors are excellent for extracting the virtues of ſeveral ſimples, and are not fitted for keeping, they have been employed as officinal menſtrua alſo; and ſubſtances of the greateſt efficacy are truſted in this form. The moſt noted of theſe medicated wines to be met with in diſpenſatories, are the vinum aleoticum, or alkaline, aleotic wine: vinum amarum, or bitter wine: vinum antimoniale, or antimonial wine: vinum aromaticum, or aromatic wine: vinum chalybeatum, ſteel wine: vinum croceum, ſaffron wine: vinum emeticum, emetic wine: vinum guaiacum, guaiacum wine: vinum ipecacoanhæ, wine of ipecacoanha: vinum millepedatum, wine of millepedes: vinum peruvianum, wine of peruvian bark: vinum ſcorbuticum, ſcorbutic wine; and vinum viperinum, viper wine.

VIOL, *viola*, a muſical inſtrument of the ſame form with the violin, and ſtruck like that with a bow. See VIOLIN.

There are viols of divers kinds. The firſt and principal, among us, is the baſs-viol, called by the Italians viola digamba, or leg-viol, becauſe held between the legs. It is the largeſt of all, and is mounted with ſix ſtrings: its neck is divided in half notes by ſeven frets fixed thereon: its ſound is very deep, ſoft and agreeable.

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The tablature, or muſic for the baſs-viol, is laid down on ſix lines or rules. What the Italians call alto viola is the counter-tenor of this; and their tenore viola, the tenor. They ſometimes call it ſimply the viol: ſome authors will have it the lyra, others the cithara, others the chelys, and others the teſtudo of the antients. See LYRA, CITHARA, *&c.*

2. The love-viol, viola d' amore, which is a kind of triple-viol or violin, having ſix braſs or ſteel ſtrings, like thoſe of the harpſichord, ordinarily played with a bow. This yields a kind of ſilver ſound, which is very agreeable. 3. A large viol with forty-four ſtrings, called by the Italians viola di bardone, but little known among us. 4. Viola baſtarda, or baſtard viol of the Italians; not uſed among us. Broſſard takes it to be a kind of baſs-viol mounted with ſix or ſeven ſtrings, and tuned as the common one. 5. What the Italians call viola di braccio, arm-viol, or ſimply braccio, arm, is an inſtrument anſwering to our counter-tenor, treble, and fifth violin. 6. Their viola prima, or firſt viol, is really our counter-tenor violin; at leaſt, they commonly uſe the cliff C *ſol ut* on the firſt line to denote the piece intended for this inſtrument. 7. Viola ſecunda is much the ſame with our tenor-violin, having the cliff of C *ſol ut* on the ſecond line. 8. Viola terza is nearly our fifth violin, the cliff C *ſol ut* on the third line. 9. Viola quarta, or fourth viol, is not known in England or France, though we frequently find it mentioned in the italian compoſitions; the cliff on the fourth line. Laſtly, their violetta, or little viol, is in reality our triple-viol, though ſtrangers frequently confound the term with what has been ſaid of the viola prima, ſecunda, terza, *&c.*

VIOL is alſo a term uſed among mariners when an hawſer, or ſtrand-rope, is bound faſt with nippers to the cable, and brought to the jeer-capſtan for the better weighing of the anchor when the main-capſtan proves inſufficient.

VIOLA, the VIOLET, in botany, a genus of the *ſyngeneſia-polygamia-monogamia* claſs of plants, the corolla whereof is compoſed of five ringent irregular petals, and is corniculated behind: the fruit is a roundiſh, trigonal, obtuſe capſule, formed of three valves, and containing three cells: the ſeeds are numerous, roundiſh, and appendiculated.

The officinal flowers of the violet have a very pleaſant ſmell, and impart a deep purpliſh-blue colour, denominated from them violet. They impart their colour and flavour to aqueous liquors. A ſyrup made from this infuſion has long maintained a place in the ſhops, and proves an agreeable and uſeful laxative to children.

VIOLATION, the act of violating; that is, forcing a woman, or committing a rape upon her. See RAPE.

This term is alſo uſed in a moral ſenſe for a breach or infringement of a law, ordinance, or the like; and it is alſo uſed for profanation. See TRANSGRESSION.

VIOLENT, in the ſchools, a thing done by force. In which ſenſe it ſtands oppoſed to ſpontaneous. See the article SPONTANEOUS.

A thing is ſaid to be violent when effected by ſome external principle, the body that undergoes it contributing nothing thereto, but ſtruggling againſt it. The ſchoolmen allow, that man, as being endued with reaſon, is capable of ſuffering ſuch violence, but brute and inanimate bodies are not.

VIOLET, *viola*, in botany. See the article VIOLA.

VIOLIN, or FIDDLE, a muſical inſtrument mounted with four ſtrings, or guts, and ſtruck, or played, with a bow. The violin, like moſt other inſtruments, conſiſts of three parts, the neck, the table, and the ſound-board. At the ſides are two apertures, and ſometimes a third is added towards the top, ſhaped like an heart. Its bridge, which is below the apertures, bears up the ſtrings which are faſtened to the two extremes of the inſtrument, at one end of them to a ſcrew, which ſtretches or looſens them at pleaſure.

The ſtyle and ſound of the viol is the gayeſt, moſt lively, and ſprightly of all other inſtruments; and hence it is, of all others, the fitteſt for dancing: yet there are ways of touching it which render it grave, ſoft and languiſhing, and fit for church or chamber muſic. It generally makes the treble or higheſt part in concerts. It is tuned by fifths: its play is compoſed of baſs, counter-tenor, tenor, and treble: to which may be added a fifth part: each part has four fifths, which riſe to a greater ſeventeenth. See FIFTH, *&c.*

In compoſitions of muſic the violin is denoted by V; two VV denote two violins.

lins. The word violin, alone, ſtands for treble-violin. When the Italians prefix alto, tenore, or baſſo, it then expreſſes the counter-tenor, tenor, or baſs-violin. In compoſitions, where there are two, three, or more different violins, they make uſe of primo, ſecundo, terzo, or of the characters I°, II°, III°, or 1°, 2°, 3°, *&c.* to denote the difference.

The violin has only four ſtrings, each of a different thickneſs; the ſmalleſt whereof makes the *e ſi mi* of the higheſt octave of the organ; the ſecond, a fifth below the firſt, makes the *a mi la*; the third, a fifth below the ſecond, is *d la re*; laſtly, the fourth, a fifth below the third, is *ge re ſol*. Moſt nations ordinarily uſe the cliff *ge re ſol* on the ſecond line, to denote the muſic for the violin only. In France they uſe the ſame cliff as the firſt line at bottom. The firſt of theſe methods is beſt where the ſong goes very low; the ſecond, where it goes very high.

VIOLONCELLO of the Italians is properly our fifth violin; which is a little baſs violin, half the ſize of the common baſs-violin, and its ſtrings juſt half as thick and half as long, which renders the ſound juſt an octave higher than the ſame. See the article VIOLIN.

VIOLONE, in muſic, a double baſs, almoſt twice as big as the common baſs-violin, and the ſtrings bigger and longer in proportion, and conſequently its ſound an octave lower than that of our baſs-violin, which has a noble effect in great concerts. See the articles CONCERT and VIOLIN.

VIPER, in zoology, a ſpecies of coluber, with the ſcuta of the abdomen an hundred and forty-five, and the ſquammæ of the tail thirty-ſix. See COLUBER.

This is the moſt poiſonous and miſchievous in its bite of all the european ſerpents. It grows to near three feet in length, and to a conſiderable thickneſs in proportion. The principal ground-colour of the body is a duſky grey: all along the back there runs a broad brown line, which is dentated on each ſide; and on each ſide of this there is a kind of continued bluiſh line, formed of a ſeries of ſpots of that colour, one of which is ſituated in the ſpace formed by every denticulation in the back line: the belly is of a bluiſh black, very bright and gloſſy, reſembling the colour of high poliſhed, ſanguined ſteel; and when cloſely examined, there is found a ſmall dot of a deep black at the apex of every ſcale. The head is large and flattiſh: the throat is of a pale colour; and the mouth is large: the edge of the upper lip is whitiſh: the iris of the eye is of a flame colour; the pupil black; and there is a blue ſpace, forming an acute angle, which ſeparates the head from the longitudinal line on the back. The poiſon of this ſerpent is confined to its mouth: at the baſis of the phangs, or long teeth, which it wounds with, is lodged a little bag containing the poiſonous liquid, a very minute portion of which mixed immediately with the blood, proves fatal. Our viper-catchers are ſaid to prevent the miſchiefs otherwiſe following from the bite, by rubbing oil olive warm on the part. The fleſh of the viper is perfectly innocent, and ſtrongly recommended as a medicine of extraordinary ſervice in ſcrophulous, leprous, and other chronical diſorders: its virtues however in theſe caſes, are probably too much exaggerated. The viper is undoubtedly a high nutritious food, and thence, in ſome kinds of weakneſſes and emaciated habits, is not undeſervedly looked on as a good reſtorative. To anſwer any valuable purpoſes, freſh vigorous vipers, not ſuch as have been long kept alive after they are caught, ſhould be liberally uſed as food. The wines and tinctures of them can ſcarce be ſuppoſed to receive any conſiderable virtue from the animal. The dry fleſh brought us from abroad is entirely inſignificant.

VIRAGO, a woman of extraordinary ſtature and courage; and who, with the female ſex, has the mien and air of a man, and performs the actions and exerciſes of men.

VIRGA, a yard. See YARD.

VIRGA is particularly uſed in law for a verge, or rod, ſuch as ſheriffs and bailiffs carry as a badge of their office. See the article VERGE.

VIRGA AUREA, in botany, the ſame with ſolidago. See SOLIDAGO.

VIRGA SANGUINEA, in botany, the ſame with the cornus. See CORNUS.

VIRGÆ, in phyſiology, a meteor called alſo columellæ and funes tentorii; being an aſſemblage of ſeveral ſtreams of light, repreſenting a bundle of rods or ropes. It is ſuppoſed owing to the ſtreaming of the ſun's beams through certain rimulæ, or chinks, at leaſt through the more lax and open parts of a watry cloud, happening chiefly in the morning and even-

ing. There is alſo another kind, conſiſting not of ſtreams of mere white light, but, as it were, painted of various colours like thoſe of the rainbow.

VIRGIN, *virgo*, a female who has had no carnal commerce with man; or more properly, who has ſtill the flos virginis, or maidenhead. In the antient chriſtian church, there were a kind of religious order conſiſting of women who made open and public profeſſion of virginity; and this before the monaſtic life or name was ever known in the world. This appears from the writings of Cyprian and Tertullian, who ſpeaks of virgins dedicating themſelves to Chriſt before there were any monaſteries to receive them. Theſe, for diſtinction's ſake, were ſometimes called eccleſiaſtical virgins and canonicæ, becauſe they were enrolled in the canon or matricula of the church. They differed from the monaſtic virgins chiefly in this, that they lived privately in their fathers houſes, and in caſes of neceſſity were maintained by the church; whereas the others lived in community and upon their own labour. Whether they made any ſolemn vow is not agreed on: and as to their conſecration, it was uſually performed publicly in the church by the biſhop, or ſome preſbyter deputed by him. See MONK, NUN, *&c.*

VIRGIN is alſo applied, by way of eminence, to Mary the mother of our Saviour, as conceiving and bringing him forth without any breach of her chaſtity. Many of the antient fathers, with the modern churches, hold, that the virgin not only conceived but brought forth, or was delivered, without breach of her virginity; and it is even alledged, that ſhe remained a virgin to the end of her life: though, as this is not recorded in holy writ, many have denied it, and held that ſhe had afterwards to do with Joſeph, and bore other children.

Purification, &c. of the holy VIRGIN. See the article PURIFICATION.

VIRGIN is alſo applied figuratively to ſeveral things that retain their abſolute purity, and have never been made uſe of. Thus virgin-wax is that which has never been wrought, but remains as it came out of the hive. Virgin-oil is that which oozes ſpontaneouſly out of the olive, *&c.* without preſſing. Virgin-gold, is that metal ſuch as it is found pure in the mine, without any mixture of allay; in which ſtate it is ſometimes ſo ſoft that it will take the impreſſion of a ſeal. Virgin-copper is a native copper found in the mine, and which has never been melted down. Virgin-quickſilver is that found perfectly formed and fluid in the veins of mines; or at leaſt ſuch as is got from the mineral earth by mere lotion, without fire. Virgin-parchment is that made of the ſkin of an abortive lamb, *&c.* See the articles WAX, OIL, *&c.*

VIRGIN'S-THREAD, a ſort of meteor that flies in the air like ſmall untwiſted ſilk; which falling upon the ground, or upon plants, changes itſelf into a ſubſtance like a ſpider's-web. In theſe northern climates it is moſt frequent in ſummer, the days being then temperately warm, the earth not exceeding dry, nor yet overcharged with moiſture. This has formerly paſſed for a ſort of dew of an earthy ſlimy nature: but naturaliſts are now agreed that the virgin's threads are no other than ſo many ſpider's-webs. See the article SPIDER'S-WEB.

VIRGIN'S-BOWER, in botany, the ſame with clematis. See CLEMATIS.

VIRGIN-ISLANDS, very ſmall iſlands of the Caribees, ſituated in the Atlantic or American-ocean, a little to the eaſtward of Porto-Rico.

VIRGINALE CLAUSTRUM, in anatomy, the ſame with hymen. See the article HYMEN.

VIRGINIA, one of the Britiſh American colonies, ſituated between ſeventy-four and eighty degrees weſt long. and between thirty-ſix and thirty-nine degrees of north lat. bounded by the river Patowmack, which ſeparates it from Maryland, on the north; by the Atlantic-Ocean, on the eaſt; by Carolina, on the ſouth; and may be extended as far weſtward as we think fit.

VIRGINITY, *virginitas*, the teſt or criterion of a virgin, or that which intitles her to the denomination. The phyſicians, both antient and modern, are exceedingly divided upon the ſubject of virginity, ſome holding that there are no certain marks or teſtimonies thereof, and others, that there are. Moſes eſtabliſhed a teſt that was to be concluſive among the Jews. The nuptial ſheets, it ſeems, were to be viewed by the relations on both ſides, and the maid's parents were to preſerve them as a token of her virginity, to be produced in caſe her huſband ſhould ever reproach her on that ſcore. In caſe the token of virginity was not found thereon, ſhe was to be ſtoned to death at her father's door. This teſt of virginity has occaſioned

occaſioned abundance of ſpeculation about the parts concerned; but the niceſt enquiries cannot ſettle any thing certain about them. Dr. Drake ſays expreſly, that whatever might be expected among the Jews, there is not the ſame reaſon to expect thoſe tokens of virginity in theſe countries; for, beſides that the Hebrews married extremely young, as is the cuſtom in all the eaſtern countries, there are ſeveral circumſtances which may here fruſtrate ſuch expectations, even in virgins not vitiated, either by any male contact, or any wantonneſs of their own. In effect, in theſe northern countries, the inclemency of the air expoſes the ſex to ſuch checks of perſpiration, as gives a great turn to the courſe of the humours, and drives ſo much humidity through the parts, as may extraordinarily ſupple and relax thoſe membranes from which the reſiſtance is expected, and from which, in hotter countries, it might more reaſonably be depended on.

What moſt commonly paſſes among us for a teſt of virginity, is the hymen; and yet the moſt curious among the anatomiſts are greatly divided, not only about the figure, ſubſtance, place, and perforations of this membrane, but even about the exiſtence thereof; ſome poſitively affirming, and others as flatly denying it. See the article HYMEN.

VIRGO, in aſtronomy, one of the ſigns or conſtellations of the zodiac, and the ſixth according to order. See ZODIAC. It is marked thus ♍, and in Ptolemy's catalogue conſiſts of 32 ſtars, in Tycho's of 39, and in the Britannic of 89.

VIRGULA DIVINA, or BACULUS DIVINATORIUS, *&c.* a forked branch, in the form of a Y, cut off an hazel-ſtick, by means whereof people have pretended to diſcover mines, ſprings, *&c.* under ground. The method of uſing it is thus: the perſon who bears it, walking very ſlowly over the places where he ſuſpects mines or ſprings may be, the effluvia exhaling from the metals, or vapour from the water, impregnating the wood, makes it dip or incline, which is the ſign of a diſcovery. Some diſpute the matter of fact, and deny it to be poſſible. Others, convinced by the great number of experiments alledged in its behalf, look out for the natural cauſes thereof: the corpuſcles, ſay thoſe authors, riſing from the ſprings or minerals, entering the rod, determine it to bow down, in order to render it parallel to the vertical lines which the effluvia deſcribe in their riſe.

VIRGULTUM, in our antient law-books, is uſed for a holt or plantation of twigs or oſiers.

VIRIDARIO ELIGENDO, a writ that lies for the choice of a verderor. See the article VERDEROR.

VIRILE, ſomething that belongs or is peculiar to a man, or the male ſex: thus the virile member is uſed for the penis; virile age, the ſtrength and vigour of a man's age, *viz.* from thirty to forty-five years, being the age wherein we are equally removed from the extremes of youth and of old age.

VIRILIA, a man's genitals, or privy members, including the penis and teſtes. See the articles PENIS and TESTES.

VIRTSUNGIANUS DUCTUS, in anatomy, a canal uſually called ductus pancreaticus. See the article PANCREAS.

VIRTUAL, or POTENTIAL, ſomething that has a power or virtue of acting or doing. The term is chiefly underſtood of ſomething that acts by a ſecret inviſible cauſe, in oppoſition to actual and ſenſible.

VIRTUAL FOCUS, in optics. See the article FOCUS.

VIRTUALITY, in the ſchools, denotes ſome mode or analogy in an object, which, in reality, is the ſame with ſome other mode, but, out of regard to contradictory predicates, is conſidered as if diſtinct therefrom.

VIRTUALLY, in the ſchools, is applied to a mode of exiſtence. A thing is ſaid to be virtually any where, when it is deemed to be there by ſome virtue, influence, or other effect, produced by it: thus the ſun is virtually on earth, *i. e.* by his light, heat, *&c.* A thing is alſo ſaid to be virtually preſent, when the virtues or properties belonging to it, and iſſuing from it, remain: in which ſenſe the forms of the elements are held to be virtually in mixed bodies. A thing is ſaid to be a cauſe virtually, or a virtual cauſe, and that two ways; the firſt, when there is no real diſtinction between it, and the effect attributed to it, and yet it is conceived by us as if it were really the cauſe thereof: thus immutability in God is the cauſe of eternity. Secondly, when an effect is not of the ſame kind with the cauſe, and yet the cauſe has the power or virtue of producing the effect: thus the ſun is not formally but virtually hot; and

the fire is not contained formally but virtually in heat.

VIRTUE, *virtus*, a term uſed in various ſignifications. In the general it denotes power, or perfection of any thing, whether natural or ſupernatural, animate or inanimate, eſſential or acceſſary. But in its more proper or reſtrained ſenſe, virtue ſignifies an habit, which improves and perfects the poſſeſſor and his actions. See the article HABIT, *&c.*

In this ſenſe virtue is a principle of acting or doing well and readily, and that either infuſed from above, ſuch as are the theological virtues; or acquired by our own application, as the intellectual or moral virtues.

For as there are two things in man, from which all his actions proceed, *viz.* the underſtanding and the will; ſo the virtue by which he is perfected, or whereby he is diſpoſed to do all things rightly, and to live happily, muſt be twofold: the one of the underſtanding, and the other of the will. That which improves the underſtanding is called intellectual, or dianoetic; and that, the will, moral and ethic; for ſince there are two things required, in order to live aright, *viz.* to know what ſhould be done; and, when known, readily to perform it; and ſince man is apt to err various ways in each reſpect, unleſs regulated by diſcipline, *&c.* he alone can deport himſelf rightly in his whole courſe of life, whoſe underſtanding and will have attained their utmoſt perfection. See the article UNDERSTANDING, WILL, ETHICS, MORALITY, *&c.*

Intellectual virtue, then, according to Ariſtotle, is an habit of the reaſonable ſoul, whereby it conceives or ſpeaks the truth, either in affirming or denying. The virtues which come under this claſs are divided into ſpeculative, which are thoſe converſant about neceſſary things, that can only be known or contemplated; and practical, which are converſant about contingent things, that may likewiſe be practiſed. Ariſtotle has another diviſion of intellectual virtues, fetched from the ſubject, as ſome of them are ſeated in the contemplative part, *viz.* thoſe converſant about neceſſary things, as ſcience, wiſdom, intelligence; and others in the practical part, ſuch are thoſe converſant about contingent things, as prudence, art, *&c.* See the article SCIENCE, *&c.*

Moral virtue is defined, by Ariſtotle, to be an elective habit, placed in a mediocrity, determined by reaſon, and as a prudent man would determine. Moraliſts uſually diſtinguiſh four principal, or, as they are vulgarly called, cardinal virtues, *viz.* prudence, juſtice, fortitude, and temperance: the reaſon of which diviſion is founded in this, that for a man to live virtuouſly and honeſtly, it is neceſſary he know what is fit to be done, which is the buſineſs of prudence: that he have a conſtant and firm will to do what he judges beſt; which will perfect the man, either as it reſtrains too violent perturbations, the office of temperance; or as it ſpurs and urges on thoſe that are too ſlow and languid, which is the buſineſs of fortitude; or, laſtly, comparatively with regard to human ſociety, which is the object of juſtice. To theſe four virtues all the reſt are referred, either as parts, or concomitants. See the article PRUDENCE, JUSTICE, *&c.*

VIRTUES, in the celeſtial hierarchy, the third rank or choir of angels, being that in order between the dominations and powers: to theſe is attributed the power of working miracles, and of ſtrengthening and reinforcing the inferior angels in the exerciſe of their functions.

VIRTUOSO, an italian term, lately introduced into engliſh, ſignifying a man of curioſity and learning, or one who loves and promotes the arts and ſciences: but among us the term ſeems to be appropriated to thoſe who apply themſelves to ſome curious and quaint, rather than immediately uſeful, art or ſtudy, as antiquaries, collectors of rarities of any kind, microſcopical obſervers, *&c.*

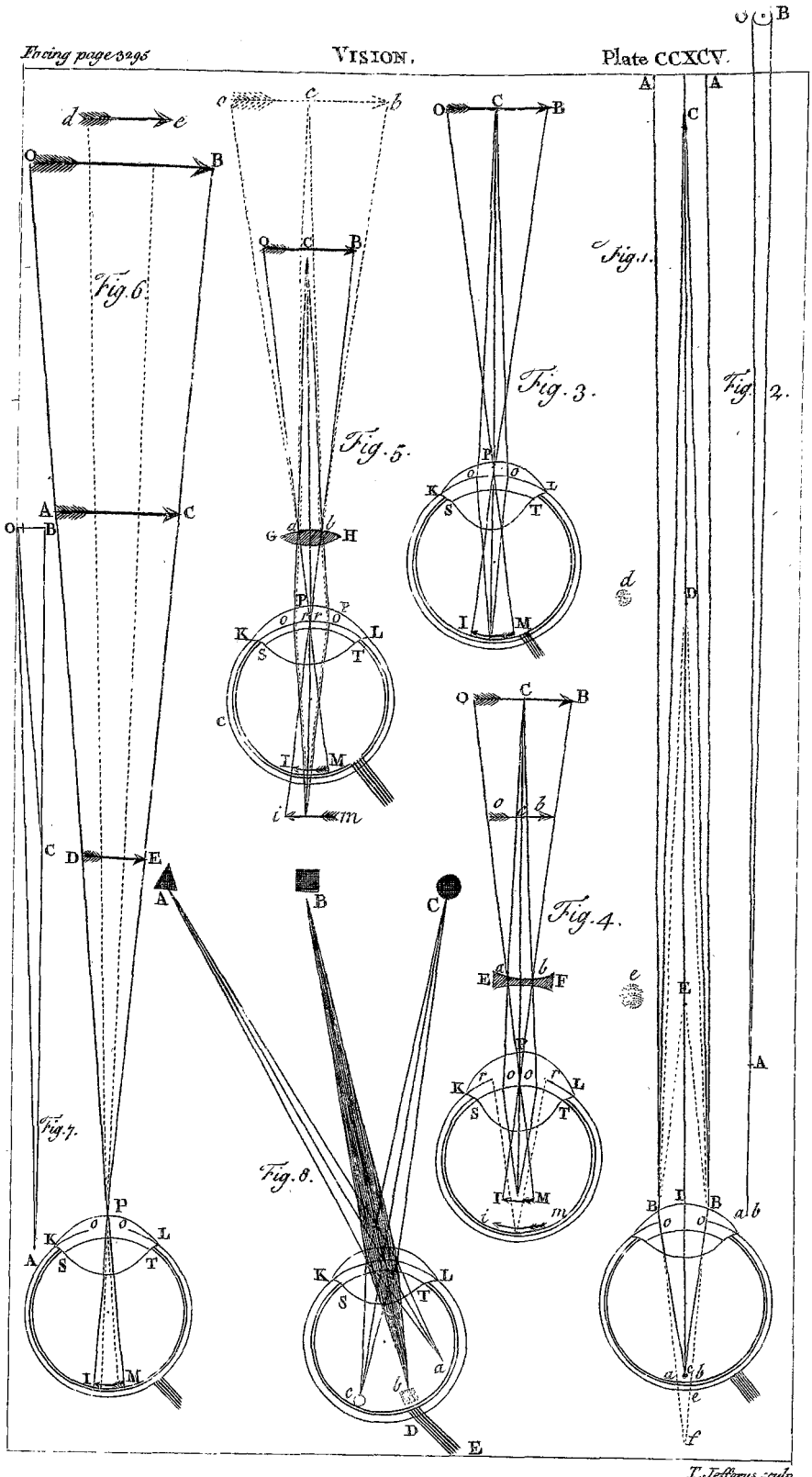
VIRULENT, a term applied to any thing that yields a virus, that is, a contagious or malignant pus. For the virulent gonorrhœa, ſee the article GONORRHOEA.

VIS, a latin word, ſignifying force or power; adopted by phyſical writers to expreſs divers kinds of natural powers or faculties. For the vis inertiæ, ſee the article INERTIÆ, *&c.*

Vis impreſſa is defined, by ſir If. Newton, to be the action exerciſed on any body, to change its ſtate, either in reſiſting or moving uniformly in a right line. This force conſiſts altogether in the action, and has no place in the body, after the action is ceaſed. See PERCUSSION, MOTION, RESISTANCE, PRESSION, CENTRIPETAL, *&c.*

VISCAGO, in botany, the ſame with ſilene. See the article SILENE.

VISCERA, in anatomy, a term ſignifying the ſame with entrails, including the heart,



T. Jefferys sculp

heart, liver, lungs, ſpleen, inteſtines, and other inward parts of the body. See the articles HEART, LIVER, &c.

VISCIDITY, or VISCOSITY, the quality of ſomething that is viſcid or viſcous, that is, glutinous and ſticky, like birdlime, which the Latins call by the name *viſcus*. Viſcid bodies are thoſe which conſiſt of parts ſo implicated within each other, that they reſiſt a long time a complete ſeparation; and rather give way to the violence done them, by ſtretching or extending every way. The too great viſcidity of foods has very ill effects; thus meats or farinæ not fermented, gellies, &c. of animals, tough cheeſe, or curds too much preſſed, produce a weight or oppreſſion in the ſtomach, wind, yawnings, crudities, obſtructions of the minuter veſſels in the inteſtines, &c. Hence an inactivity of the inteſtines themſelves, a ſwelling of the abdomen; and hence a viſcidity of the blood, from the re-union of the viſcid particles; obſtructions of the glands; paleneſs, coldneſs, tremors, &c.

VISCOUNT. See VICOUNT.

VISCUM, MISLETOE, in botany, a genus of the *dioecia-tetrandria* claſs of plants, having no corolla; the fruit is a round ſmooth berry, containing one cell, wherein is a ſingle carnoſe ſeed, obtuſe, compreſſed, and obverſely cordated.

This plant was held in veneration by the ſuperſtition of former ages it was hung about the neck, to prevent witchcraft; and taken internally to expel poiſons. Of late times it has been celebrated as a ſpecific in epilepſies, palſies, &c. virtues which it were greatly to be wiſhed that experience gave any countenance to.

VISET, a town of the auſtrian Netherlands, in the province of Limburg, ſituated on the eaſt ſhore of the river Maes, ſeven miles north of Liege.

VISIAPOUR, a city of the hither peninſula of India, in the province of Decan, ſituated one hundred and thirty miles north-eaſt of Goa: eaſt longit. 75°, and north lat. 16° 45′.

VISIBLE, ſomething that is an object of ſight or viſion, or ſomething whereby the eye is affected, ſo as to produce a ſenſation. See the articles VISION, SIGHT, EYE, &c.

VISION, *viſio*, in optics, the act of ſeeing or perceiving external objects, by means of the organ of ſight, the eye. See the article EYE.

Such is the ſubſtance and form of the humours of the eye, when lodged in their proper receptacles, that rays of light, in paſſing through them, are affected in like manner as in paſſing through a convex lens; and therefore, to underſtand perfectly the nature of viſion, we muſt firſt be acquainted with the doctrine of light and lenſes. See the articles LIGHT and LENS.

Now as the ſeveral pencils of rays flowing from the diſtinct points in the ſurface of an object placed before a lens, are collected into ſo many points at a certain diſtance, on the other ſide of the lens, and form an image there, when received upon white paper; ſo pencils of rays proceeding from an object placed before the eye, at a proper diſtance from it, and being refracted in paſſing through the humours of it, are collected into their reſpective foci upon the retina, where they form a repreſentation of that object; and by their impulſes upon the tender nerves of the retina, an idea of the object is excited in the mind. See REFRACTION.

Viſion is diſtinguiſhed into bright and obſcure, diſtinct and confuſed. It is ſaid to be bright, when a ſufficient number of rays enter the pupil at the ſame time; and obſcure, when too few: it is called diſtinct, when each pencil of rays is collected into a focus, exactly upon the retina; and confuſed, when they meet before they come at it, or when they would paſs it before they meet.

Now ſince parallel rays only have their focus upon, or meet in, the retina, they alone can paint there a diſtinct image of an object, or produce a diſtinct viſion of it. If, therefore, the object be ſo near, that the rays from any particular point come diverging to the pupil, they will neceſſarily require a greater focal diſtance than the retina, or bottom of the eye; whence the rays not being united upon the retina, that point cannot be there diſtinctly repreſented, but will appear confuſed: thus, AB, AB (plate CCXCV. fig. 1.) are two parallel rays falling upon the pupil of the eye; and CB, CB, two other rays, which, though really diverging, yet, by reaſon of the remoteneſs of the point C, whence they proceed, will at the entrance of the eye be ſo nearly coincident with the parallel rays, as to have nearly the ſame focal point on the retina, ſo that the point C will there be diſtinctly repreſented by *c*. But if any other point E, be viewed very near the eye, ſo that the angles EBA, which they contain with the parallel rays, be

very conſiderable, they will, after refraction, tend towards the point f, in the axis of the eye produced, and upon the retina will repreſent only a circular indiſtinct area; like that at e, whoſe breadth is equal to ab, the diſtance of the rays upon the retina. The ſame point at D, will not be quite ſo much dilated, as the rays DB, DB, have a leſs degree of divergence.

It is found by experience, that the neareſt limit of diſtinct viſion is about ſix inches from the eye; for if a book be held nearer to the eye than that, the letters and lines will immediately become confuſed and indiſtinct. Now this cauſe of indiſtinct viſion may be in ſome meaſure remedied, by leſſening the pupils, which we naturally do in looking at near objects, by contracting the annular fibres of the uvea; and artificially, by looking through a ſmall hole made with a pin in a card, &c. for then a ſmall print may be read much nearer than otherwiſe: the reaſon is plain, for the leſs the diameter of the aperture or pupil BB, the leſs will the rays diverge in coming from D or E, or the more nearly will they coincide with parallel rays.

Beſides the contraction of the pupil, nature has furniſhed the eye with a faculty of adapting the conformation of the ſeveral parts to the reſpective poſitions of objects, as they are nigh or more remote; for this purpoſe, the cornea is of an elaſtic yielding ſubſtance, and the cryſtalline is incloſed with a little water in its capſula, that by the contraction and relaxation of the ciliary ligament, the convexity of both the ſurfaces of the capſula may be a little altered, and perhaps the poſition of the cryſtalline; by which means the diſtance from the retina may be fitted and adjuſted to nigh objects, ſo as to have their images very diſtinctly formed upon the retina.

Nigh objects only have been mentioned (by which are meant ſuch as are near the limit of diſtinct viſion, as between ſix and a hundred inches diſtance) becauſe objects more remote require ſcarce any change of the conformation of the eye; the focal diſtance in them varying ſo very little. Thus, ſuppoſe all the refraction of the eye were equivalent to that of a double and equally convex lens, whoſe radius $r = 1$ inch: if then the object were 10 inches diſtant, or $d = 10$, we ſhould have the focal diſtance $f = \frac{dr}{d-r} = \frac{10}{9} = 0.11111$; and if another object be diſtant 100 inches, then $d = 100$, and $f = \frac{dr}{d-r} = \frac{100}{99} = 0.10101$. The difference between theſe two focal diſtances is 0.0101, *viz.* the hundredth part of an inch, which the eye can eaſily provide againſt. If we go beyond this, ſuppoſe to an object 1000 inches diſtant, we have $f = \frac{dr}{d-r} = 0.1001001$, which is only the thouſandth part of an inch leſs than the former, and is therefore inconſiderable.

Now rays proceeding from any point more than 6 inches diſtant from the eye, will, when they enter the pupil, be very nearly coincident with parallel rays; and therefore, to a ſound eye, diſtinct viſion cannot be effected at leſs than 6 or 8 inches diſtance, as may be found by any one who will make the experiment. Six inches, therefore, conſtitutes the limit of diſtinct viſion, for near objects: we ſhall now conſider the limit for remote objects; for objects may appear indiſtinct and confuſed, by being removed too far from the eye, as well as when they are too near it. And in this caſe we find objects will appear diſtinct ſo long as their parts are ſeparate and diſtinct in the image formed on the retina; and thoſe parts will be ſeparate ſo long as the axes of the pencils of rays, which paint them, are ſeparate at their incidence on the retina; that is, ſo long as the angle they contain is not leſs than one tenth of a degree: for it is found, by experience, that objects and their parts become indiſtinct, when the angle they ſubtend at the pupil of the eye is leſs than that quantity.

Thus, ſuppoſe OB (*ibid.* fig. 2.) to be a circle one tenth of an inch in diameter, it will appear diſtinct with its central ſpot, till you recede to the diſtance of 6 feet from it, and then it becomes confuſed; and if it be one fifth of an inch, it will begin to be confuſed at 12 feet diſtance, and ſo on: in which caſes the angle ſubtended at the eye, *viz.* OAB, is about one tenth of a degree, or 6 minutes. And thus all objects, as they are bigger, appear diſtinct at a greater diſtance; a ſmall print will become confuſed at a leſs diſtance than a larger; and in a map of England, the names of places in ſmall letters become firſt indiſtinct, where thoſe in capitals are very plain and legible; at a bigger diſtance theſe become

become confuſed, while the ſeveral counties appear well defined to a much greater diſtance: theſe alſo at laſt become ſo indiſtinct as not to be known one from another, when at the ſame time the whole iſland preſerves its form very diſtinctly, to a very great diſtance; which may be ſo far increaſed, that it alſo, at laſt, will appear but a confuſed and unmeaning ſpot.

We have ſeen the cauſes of indiſtinct viſion in the objects, and ſhall now enquire what may produce the ſame in the eye itſelf. And firſt it is to be obſerved, that there is a proper degree of convexity in the cornea KPL (*ib.* fig. 3.) and cryſtalline ST, for converging parallel rays to a focus on the bottom of the eye, in a ſound ſtate; hence every diſtant object OB, will have its image IM, accurately depicted on the retina, and by that means produce diſtinct viſion.

But if the cornea KPL (*ib.* fig. 4.) or cryſtalline ST, or both, ſhould chance to be a little more convex than juſt, it will cauſe the pencil of rays *o*C*o*, which comes to the pupil *oo*, from any point C in the object OB, to unite in a focus before they arrive at the retina in the bottom of the eye; the image IM, of the object OB, will be formed in the body of the vitreous humour, and will therefore be very confuſed and indiſtinct on the retina at *im*. A perſon having ſuch an eye, is called myops, in alluſion to the eye of a mouſe, by reaſon of its great convexity. To remedy this defect of the eye, a concave lens EF, is applied before it; for by this means the rays C*a*, C*b*, which fall diverging on the lens, will, after reflection through it, be made to proceed ſtill more diverging, *viz.* in the directions *ar*, *br* (inſtead of *ao*, *bo*) as if they came from the point *c*, inſtead of C. Hence it follows, that ſince the rays are made to fall with greater divergence upon the eye, they will require a greater focal diſtance to be united in the axis; and, conſequently, the focus may be made to fall very nicely on the retina, by uſing a lens EF, of a proper degree of concavity; ſo that diſtinct viſion will be effected, in the ſame manner as in an eye of a juſt conformation.

Since the point *c*, is nearer to the eye than the point C, the apparent place of objects ſeen through a concave lens is nearer than the true place; or the object will appear at *OB*, inſtead of OB; and alſo, ſince converging rays O*a*, B*b*, proceed leſs converging after refraction than before, the object appears under a leſs angle; and, therefore, the apparent magnitude of objects, ſeen by a concave lens, is leſs than the true: the object is alſo leſs luminous, or bright, ſeen thro' ſuch a lens, than without it; becauſe the rays being rendered more divergent, a leſs quantity enters the pupil of the eye, than otherwiſe would do: for the picture is always more or leſs bright, according as it is made by a greater or leſs quantity of rays. Laſtly, it appears from what has been ſaid, that when a concave lens EF, cannot be applied, we may ſtill effect diſtinct viſion, by leſſening the diſtance between the object and the eye: for it is plain, if OB be ſituated at *OB*, the image at IM, will recede to *im*, upon the retina, and be diſtinct, in the ſame manner as when made ſo by the lens EF.

On the other hand, when the cornea or cryſtalline is too flat, *&c.* (as often happens by age) an object OB (*ib.* fig. 5.) placed at the ſame diſtance from the eye PC, as before, will have the rays C*o*, C*o*, after refraction in the eye, proceed to a focus beyond the bottom of the eye, in which, if a hole were made (in an eye taken out of the head) the rays would actually go on, and form the image *im*; which image muſt, therefore, be very confuſed and indiſtinct on the retina. To remedy this defect, a convex lens GH, is applied, which cauſes the diverging rays C*a*, C*b*, to fall leſs diverging upon the eye, or as if they came from a point more remote, as *c*; by which means the focal diſtance is ſhortened, and the image duly formed on the retina at IM, by which diſtinct viſion is produced.

Hence the apparent place of the object is at *c*, is more diſtant than the true place at C; and its apparent magnitude *OB* is greater than the true, becauſe the converging rays O*a*, B*b*, are by this lens after refraction made to unite ſooner than before, and ſo to contain an angle *OPB* greater than the true OPB. The object appears through a convex lens brighter than without, becauſe by this means a greater quantity of rays enter the pupil; for the rays *ao*, *bo*, are by the lens made to enter in the directions *ar*, *br*, which are nearer together, and leave room for more to enter the pupil all around between *o* and *r*.

As the image of the object painted on the retina is greater or leſs, ſo will the apparent

apparent magnitude of the object be likewise; or, in other words, the angle IPM (*ibid.* fig. 6.) ſubtended by the image is always equal to the angle OPB ſubtended by the object at the eye, and therefore the image IM will be always proportional to the object OB. Hence it follows, that the angle OPB under which an object appears is the meaſure of its apparent magnitude.

Therefore objects of different magnitudes, as OB, AC, DE, which ſubtend the ſame angle at the eye, have the ſame apparent magnitude, or form an equal image in the bottom of the eye. Hence it is that objects at a great diſtance have their magnitude diminiſhed proportionally: thus the object DE removed to *D E* appears under a leſs angle *D P E*, and makes a leſs image on the retina, as ſhewn by the dotted lines.

The angles of apparent magnitude OAB, OCB, (*ibid.* fig. 7.) when very ſmall, are as their ſines, and therefore as the ſides OC and OA, or BC and BA; that is, the apparent magnitude of the object OB, at the diſtances BC and BA, is inverſely as thoſe diſtances; or its magnitude at C is to that at A as AB to CB.

The more directly any object is ſituated before the eye, the more diſtinctly it will appear; becauſe thoſe rays only which fall upon the eye near its axis can be convened to a point in the bottom of the eye on the retina, and therefore that part of the image only which is formed by the direct pencil of rays can be clear and diſtinct; and we are ſaid to ſee an object by ſuch a pencil of rays, but only to look at it by the others which are oblique. Suppoſe A, B, C, (*ibid.* fig. 8.) repreſent three pieces of paper ſtuck up againſt the wainſcot of a room at the height of the eye; if then a perſon places himſelf ſo before them, and ſhutting his right eye views them with his left, it is very remarkable that the paper B, whoſe pencil of rays falls upon the inſertion D of the optic nerve DE, will immediately vaniſh or diſappear, while the two extreme papers C and A are viſible; and by altering the poſition of the eye, and its diſtance, any of the papers may be made to vaniſh, by cauſing the pencil of rays to fall on the point D. Why the rays of light ſhould not excite the ſenſation of viſion in the point D, where the fibres of the nerves begin to ſeparate and expand every way to form the retina, is not eaſy to ſay. But it is worth notice, that the nerve DE is for that reaſon placed on one ſide of the eye, where only the oblique rays come, the loſs of which is not conſiderable, and no way affects or hinders the perfection of ſight: whereas had it entered in the the middle of the bottom of the eye, it had rendered uſeleſs all the direct rays, by which the moſt perfect and diſtinct viſion is effected; and we could have had only a confuſed and imperfect perception of objects, by oblique collateral rays.

The laws of viſion, brought under mathematical demonſtration, make the ſubject of optics, taken in the greateſt latitude of the word; which is commonly uſed, in a more reſtrained ſenſe, for the doctrine of direct or ſimple viſion, performed by rays paſſing directly, or in a ſtraight line, from the object to the eye. The doctrine of reflected viſion, or that performed by means of rays reflected from mirrours, makes the ſubject of catoptrics; and refracted viſion, or that performed by rays refracted through glaſs lenſes, or other mediums, conſtitutes that branch of optics, called dioptrics. See the articles OPTICS, DIOPTRICS, CATOPTRICS, LENS, MIRROUR, REFLECTION, and REFRACTION.

VISION, among divines, an appearance which God occaſionally ſent his prophets and ſaints, either by way of dream or reality: ſuch were the viſions of Ezekiel, Amos, St. Paul, *&c.*

Beatific VISION, denotes the act whereby the angels and bleſſed ſpirits ſee God in Paradiſe.

VISITATION, in law, an act of juriſdiction, whereby a ſuperior, or proper officer, viſits ſome corporation, college, church, or other public or private houſe, to ſee that the laws and regulations thereof be duely obſerved.

Among us, viſitation is that office performed by the biſhop in every dioceſe once in three years, or by the archdeacon every year, by viſiting the churches and their rectors throughout the whole dioceſe, *&c.* The biſhop's commiſſary alſo holds a court of viſitation, to which he may cite all church-wardens and ſideſmen; and to whom he exhibits his articles, and makes inquiry by them.

VISMATHUM, BISMUTH, in natural hiſtory. See BISMUTH.

VISNAGA, in botany, a ſpecies of daucus. See the article DAUCUS.

VISNE,

VISNE, *viſnetum*, in law books, ſignifies a neighbouring place, or place near at hand.

VISTULA, or WEISEL, a large river of Poland, which, taking its riſe in the mountains ſouth of Sileſia, viſits Cracow, Warſaw, *&c.* and continuing its courſe north, falls into the Baltic Sea below Dantzick.

VISUAL, in general, ſomething belonging to viſion. See the article VISION.

Thus, rays of light, coming from an object to the eye, are called viſual rays; and the viſual point in perſpective is a point in the horizontal line, wherein all the viſual rays unite. See the articles RAY and PERSPECTIVE.

VITAL, in phyſiology, an appellation given to whatever miniſters principally to the conſtituting or maintaining of life in the bodies of animals: thus, the heart, lungs, and brain are called vital parts; and thoſe operations of theſe parts, whereby the life of animals is maintained, are called vital functions. See the article FUNCTION.

VITERBO, a city of Italy, twenty-five miles north of Rome.

VITEX, the CHASTE-TREE, in botany, a genus of the *didynamia-angioſpermia* claſs of plants, with a monopetalous, ringent, and bilabiated flower, each lip of which is trifid: the fruit is a quadrilocular, globoſe berry; containing four ſeeds. See AGNUS CASTUS.

VITICELLA, in botany, a ſpecies of clematis. See CLEMATIS.

VITIS, the VINE, in botany, *&c.* See the article VINE.

VITIS IDÆA, in botany, a ſpecies of vaccinium. See VACCINIUM.

VITREOUS *humour of the eye*, is ſo called from its reſemblance to glaſs in fuſion, being very like a fine clear jelly in appearance: it probably, ſays Heiſter, conſiſts of extremely fine veſicles, containing a limpid and perfectly pellucid humour. It fills the poſterior part of the eye, and is every where contiguous to to the hinder part of the retina, which it ſerves alſo to expand. See EYE.

VITRIFICATION, in chemiſtry, is the converting a body into glaſs, by means of fire. See GLASS.

Of all bodies, fern-aſhes, ſand, pebbles, *&c.* vitrify the moſt readily; and accordingly, it is of theſe that glaſs is principally made.

VITRIOL, in natural hiſtory, a compound body formed of the particles of metals diſſolved by the acid of ſulphur, and that either by the operations of nature, within the earth, or in the chemiſts elaboratory by proper admixtures and aſſiſtances, and afterwards, by the help of water, brought into the form of a ſalt.

The vitriols, therefore, very much approach the nature of metals, and, in ſome inſtances, are found to have taken up other ſubſtances, particularly, ſome of the ſemi-metals among them, as, the white vitriol, which contains zink. See the article ZINK.

The other metals we find diſſolved in this manner in the bowels of the earth, and there formed into vitriols, are iron and copper. Theſe, therefore, are the great baſis of thoſe ſalts; and according as they belong to one or the other of them, are to be divided into the cupreous and the ferrugineous vitriols.

The naturaliſt, who collects for his amuſement, will meet with vitriols containing theſe two metals, in various proportions, in the ſame maſs. The blue-green vitriol of Hungary and Tranſylvania, and many other of the foſſiles of this claſs are of that kind.

We ſhall here only conſider thoſe vitriols fit for the uſe of medicine, and, therefore, treat of the diſtinct and determinate vitriols which contain only the particles of one of theſe metals. Of theſe there are but three kinds, *viz.* 1. Green vitriol. 2. White vitriol. 3. Blue vitriol. To theſe, however, we are to ſubjoin the vitriolic minerals, miſy, ſory, melantina, *&c.* which are all of them, properly, the ores of vitriols. See MISY, SORY, *&c.*

1. Green vitriol has iron wholly for its baſis. It is formed ſolely of that metal, diſſolved by the acid of ſulphur, and by means of water reduced to the form of ſalt. It is of two kinds, natural and factitious; the natural or native kind is known by the name of green vitriol; the common appellation of the other is copperas. See COPPERAS.

It is a tolerably pure and pellucid ſalt, of a compact and regular texture, conſiderably heavy, but friable, and eaſily ſhattering to pieces on the ſmalleſt blow. It is of a fine, pale, graſs-green colour. It will not melt, or wholly run to water in a damp air, but it is very apt to be moiſt on the ſurface; it very readily diſſolves in water, and after evaporation, freely ſhoots again into regular cryſtals, the true figure of which is a thick rhomboid; but they are ſeldom perfect or regular.

regular. Expoſed to the fire, it becomes thin like water, boiling and bubbling up, and emitting a very thick fume. After this it grows thicker, and, finally, calcines to a grey powder; and from this, if the fire be continued and made more violent, to a fine purple matter, called colcothar of vitriol. See COLCOTHAR.

In England, where the greateſt quantity of this vitriol is made, it is formed from the common greeniſh pyrites, with the addition of old iron. The people who collect theſe pyrites, are not at the pains of ſearching it among the ſtrata, but they pick it up on the ſea coaſts of Eſſex, and other places, under cliffs, compoſed of ſtrata of clay, out of which the ſea waſhes it, and leaves it on the ſhore. This pyrites they expoſe to the air in vaſt heaps, and, in conſequence of that, it by degrees begins to ſwell and burſt, and ſhoot out in ſalts. They pile up theſe heaps in a kind of pits lined with clay, now and then turning them when their ſalt begins to appear in a downy efflorescence on the ſurfaces of the pieces they fall into, on breaking; the time of making vitriol being near. Theſe efflorescences diſſolve by the rains and dews, and are, in fine, converted into an acrid liquor, which is conveyed from the bottom of the pits into leaden boilers, into which a quantity of old iron is alſo thrown; the fire is made under theſe, and the liquor is kept boiling for three days, or more, and is all the time ſupplied with freſh parcels of iron, ſo long as it will act upon them. The old iron, picked up by the poor people about our ſtreets, is ſold to the vitriol or copperas makers with this intent. When the liquor is boiled to a proper conſiſtence, it is let out into large coolers, in which there are ſticks placed acroſs, to which, as well as to the ſides of the veſſel, the vitriol adheres in large cryſtals, of the form and texture above deſcribed.

This ſalt, on a chemical analyſis, affords a very ſtrong acid ſpirit; or, as it is uſually, though very improperly, called, oil, which is a ſolvent for many of the metals, and effervesces very violently with an alkali, and even with ſpirit of wine, or common water. Mixed with ſal armoniac, it ferments violently, but the fermentation is attended with great coldneſs, inſtead of the heat uſual on theſe occaſions; and what is very ſingular is, that, while the fermenting mixture itſelf is thus cold, the vapour that ariſes from it is evidently hot to the hand. After the diſtillation of this acid liquor of vitriol, what remains in the retort is a red earth called colcothar; it contains iron, and is a ſtrong aſtringent. See the article ALKALI.

In medicine, this ſpirit is given internally in fevers, and hæmorrhages, and particularly in malignant fevers of the petechial kind; to be taken in all the drink, in ſuch quantity as to give an agreeable acidity to it.

Vitriolated tartar is another very valuable medicine, prepared from green vitriols, which attenuates the humours, reſiſts putrefaction, and opens obſtructions of the viſcera. See TARTAR.

2. White vitriol is a true and genuine, though not a pure, vitriol of iron; the colour of which, that has ſo long perplexed the world to account for, is at length found to be owing to a mixture of zink in it.

The white vitriol, uſed in the ſhops, is all prepared from the native ſalt of the ſame name and colour, by ſolution and evaporation. It is a ſafe, gentle, and expeditious vomit; being given in ſolution, from ten grains to a ſcruple, or more: it is alſo uſed externally in collyriums, intended againſt inflammations of the eyes; and is a very powerful ſtyptic in injections to ſtop the gleet that ſometimes remains after the cure of a gonorrhœa. See GONORRHOEA.

3. Blue vitriol is a vitriol which has copper for its baſis. It is only met with ſuſpended in the waters of certain ſprings, from which it is obtained by means of evaporation and cryſtallization. The water of ſuch ſprings as are found ſtrongly enough impregnated with copper to be worth the working for vitriol, is ſaved in reſervoirs, and evaporated to a proper ſtandard; after which it is let out into coolers, where it ſhoots into the beautiful cryſtals we ſee; which have the ſame qualities with the water, and on ſolution in common water, they make a ziment-water, not to be diſtinguiſhed from the native kind. See ZIMENT.

Blue vitriol is not given internally; but is of great uſe in external applications. The blue vitriolic water of the ſhops is made by diſſolving three ounces of blue vitriol, and two ounces of alum, in a pint and a half of boiling water; afterwards add two ounces of ſtrong ſpirit or

oil

oil of vitriol, filtring the whole for uſe. It is an excellent ſtyptic, and particularly ſerviceable in hæmorrhages of the noſe. See HÆMORRHAGE.

VITRIOLATED, among chemiſts, ſomething that has vitriol infuſed in it.

VITRIOLIC, an appellation given to whatever abounds with, or partakes of, the nature of vitriol: thus ſuch foſſile bodies as contain vitriol, are called vitriolic minerals, or ores of vitriol; as the pyrites, chalcites, miſy, ſory, melanteria, marcaſites, &c. See the articles PYRITES, CHALCITES, &c.

VITRIOUS, or VITREOUS *humour of the eye*. See the article VITREOUS.

VITRY, a town of Champaign, in France, forty ſix miles ſouth-eaſt of Rheims.

VITTA, in anatomy, that part of the amnios, which ſticks to an infant's head, when juſt born. See AMNIOS.

VITUS's DANCE, *chorea ſancti viti*, in medicine, a ſort of convulſion, which boys and girls are ſubject to, from the age of ten years, to the time of puberty: it diſcovers itſelf firſt by a kind of lameneſs, or an inſtability of one of the legs, which they draw after them in a ridiculous manner; nor can they hold the arm of the ſame ſide ſtill for a moment; and before they can bring a cup to their mouth, they uſe a thouſand odd geſticulations. In a convulſive paroxyſm, the limbs are ſtrongly agitated; the hands are ſometimes put behind them, and ſoon after they ſeem to be beating the air; and their legs will be drawn hither and thither, as if they were dancing ſome antic dance. See CONVULSION and SPASM.

Dr. Mead thinks this diſorder to be rather paralytic than convulſive, and that it may be cured by the uſe of cold baths, and chalybeate medicines. Sydenham's method of cure is this: firſt, take off ſeven or eight ounces of blood, more or leſs, according to the ſtrength of the patient, from the arm; and the next day, let the patient take a gentle purge of rhubarb, ſena, manna, &c. In the evening of the ſame day, let him take a draught, with a ſcruple of venice-treacle, and eight drops of liquid laudanum mixed in honey and milk-water. This purging and opiate draught is to be repeated at ſome days diſtance; the bleeding is alſo to be repeated to the fourth time; and in the intermediate days, a cordial and nervous electuary is to be given, compoſed of the conſerves of roſemary, orange-peel, and roman wormwood, with venice-treacle, candied nutmeg, and candied ginger; of this, the bigneſs of a nutmeg may be given every morning and afternoon, drinking after it a decoction of piony, maſterwort, and elecampane, and angelica-roots, the leaves of rue, ſage, betony, and other cephalic plants, with orange-peel, and juniper-berries. Spirit of harts-horn may alſo be given every night in ſmall doſes, in a nervous julep, and plaſters of gum caranna may be applied to the ſoles of the feet. According as the cure advances, the patient recovers the uſe of his hand and foot; and his amendment may always be diſcovered by letting him attempt to bring a groſs of any liquor to his mouth in a ſtrait line: though the bleeding ſhould not be repeated beyond the fourth time, yet the alterative and purging medicines ſhould be continued till the patient is quite well; and as people are ſubject to relapſes in this diſorder, it is proper to give the ſame medicines, and to bleed at the return of that ſeaſon of the year.

VIVA VOCE, a latin phraſe frequently uſed in engliſh writers, and literally ſignifying, by word of mouth.

VIVARY, in law books, a term indifferently uſed for a park, warren, or fiſh-pond. See the article PARK, &c.

VIVERRA, the FERRET, in zoology. See the article FERRET.

VIVIERS, a city of Languedoc, in France, ſituated on the river Rhone, twenty miles north of Orange.

VIVIFICATION, in medicine, the art of vivifying; that is, of contributing to the action that gives life, or maintains life.

The chemiſts, alſo, uſe the word in ſpeaking of the new force, vigour, and luſtre, which, by this art, they give to natural bodies; particularly to mercury, which, after having been fixed or amalgamated, they reſtore to its firſt ſtate.

VIVIPAROUS, *viviparus*, in natural hiſtory, an epithet applied to ſuch animals as bring forth their young alive and perfect, in contradiſtinction to them that lay eggs, which are called oviparous animals. See GENERATION.

VIVO, in architecture the ſhaft or fuſt of a column. See COLUMN.

The term is alſo uſed in a more particular ſenſe for the naked of a column, or other part.

VIZIER, or VISIER. See VISIER.

UKRAIN, a province of Muſcovy, lying

northwards of Little Tartary, ſo called as being a frontier againſt Turky.

ULADISLAW, a city of Great Poland, ſituated on the river Boriſthenes, eighty miles north-weſt of Warſaw: eaſt long. 19°, and north lat. 53°.

ULCER, *ulcus*, in ſurgery, is a ſolution of the ſoft parts of our bodies, together with the ſkin, produced by ſome internal cauſe, as an inflammation, abſceſs, or acrimonious humors. But wounds which become inveterate, and even contuſions, when difficult of cure, come within this definition, and paſs, at length, into ulcers, and are commonly ſo called. See the article ABSCESS, WOUND, *&c.*

The proper and uſual ſeat of an ulcer, then, is in any of the ſofter parts of the body, as the ſkin, fat, glands, fleſh, and internal viſcera. For if there be any exulceration or corroſion in the harder parts, as the bones, it comes rather under the notion of a caries, or what is commonly called ſpina ventoſa, than that of an ulcer; though, on account of ſome kind of reſemblance which it has with the ulcer, or eroſion, of the ſofter parts, they are ſometimes treated of in conjunction. See CARIES, *&c.*

Ulcers can by no means be reckoned all of one kind, but are diſtinguiſhed into various ſpecies, on many accounts; as, 1. with reſpect to the different parts of the body in which they are ſeated; for, ſometimes, they infeſt the ſkin, at other times the fat, and ſometimes the glands and fleſh. 2. As to their magnitude; for ſome ulcers are large and extended, others ſmall, and contracted within narrow limits; ſome deep, others ſhallow and more ſuperficial; in particular, ulcers of a conſiderable depth, but narrower, and more eſpecially diſtinguiſhed by the narrowneſs of their orifice or beginning, uſually paſs under the peculiar denomination ſinus or fiſtula. Ulcers differ, 3. With regard to duration; for ſome are recent, others inveterate. 4. On account of their attendant ſymptoms; in which reſpect ſome ulcers are mild and favourable, others malignant, that is, attended with very acute pains, or fœtid, putrid, pinguious, rheumy, or diſcharging much ichor, creeping or ſpreading, cancerous, or inclining to a cancer, callous, fiſtulous, or verminous; there is a difference between them, 5. With reſpect to their cauſes, in which light they aſſume the epithets of ſcorbutic, venereal, carious, cancerous, peſtilential, and ſuch as are ſuppoſed to proceed from faſcination. In the laſt place, ulcers are diſtinguiſhed by the parts in which they are ſeated. Thus, ſome infeſt the noſtrils, others, the fauces, palate, breaſts, and anus; and one ſort has the name of fiſtula lacrymalis. See the articles SINUS, FISTULA, *&c.*

The method of cure in ulcers is extremely various, as adapted to the great variety of the diſeaſe; for when the ulcer is but recent, it is to be healed in the ſame manner as a recent wound or abſceſs. We muſt firſt, then, begin with mundification, or cleanſing the ulcer; after that proceed to incarn, or fill the cavity with new fleſh; and, laſtly, cover and conglutinate the ſame as much as poſſible, with a fair and even cicatrix.

Mundification of an ulcer is, according to Heiſter, uſually performed in the following manner: firſt, the corrupted matter is evacuated; or, when it diſcharges itſelf not ſo freely as it ought, gently expreſſed with the fingers; if there be a deep ſinus belonging to the ulcer, it is to be exterged by ſome proper injections; or, if the place be open enough, by repeated intromiſſions of freſh lint. If there be any pieces of membranes, or other corrupted pinguious parts, left in the ulcer, the beſt way to eject them is, at every dreſſing, to introduce into the place lint moiſtened with ſome digeſtive ointment, and cover it with a plaiſter of diachylon, diapalma, or ſomething of the like nature; and upon that, apply compreſſes, and over the whole a bandage: this method is to be carefully followed till the place be thoroughly cleanſed, or till the bottom of the ulcer appears quite red, and covered with new fleſh.

After due mundification, the next buſineſs is to fill the ulcer with new fleſh, which is performed by the help of ſuch medicines as are commonly called ſarcotics. The beſt and moſt effectual, by many degrees, is the digeſtive ointment; for without ſome extraordinary impediment, this digeſtive is, of itſelf, ſufficient to produce new fleſh. It is, indeed, the manner of almoſt all ſurgeons very gravely to recommend every one his proper balſamics for the procuring of new fleſh; but it is preſumed, there is no neceſſity for them to be ſo careful and ſolicitous in this point, ſince there is, in this very digeſtive, a balſamic virtue; and it ought, beſides, to be conſidered, that this new fleſh owes its generation, not ſo much

much to the aſſiſtance of medicines, as the benefit of nature: for all the care and diligence of the ſurgeon have ſcarce any other effect, than to remove all ſuch things as are hurtful, and may prove impediments to a cure. If any one, however, ſhould think this digeſtive ointment not ſtrong enough for his purpoſe, he may try balſam of arcæus, balſam of Peru, balſam of meccha, balſam of ſulphur, eſſence of myrrh and aloes, oil of myrrh per deliquium, oil of eggs, and other vulnerary balſams of the like kind, which may be uſed in its ſtead; and, by the beſt means he can procure, to accompliſh a perfect conglutination.

When an ulcer has penetrated ſo deep as to have its bottom remote, not only from ſight, but from the reach of medicines, it may ſeem neceſſary in every dreſſing, after expreſſing the corrupted matter collected within, to make an injection of ſome cleanſing and healing liquor; ſuch as a decoction of agrimony and birthwort mixed with honey of roſes, or eſſence of myrrh and aloes, or what Belloſte, in his Hoſpital-ſurgeon, recommends, a decoction of walnut-leaves mixed with ſugar before the place be bound up, till the bottom is conglutinated, and to continue the ſame till the ulcer is filled up. See VULNERARY, &c.

The ulcer being, by ſome means or other, as may ſeem moſt adviſeable, incarned and filled up, the induction of a fit and decent cicatrix muſt be completed; but if by ſuch means you cannot prevent a luxuriancy of fleſh, with a moiſtneſs of the ulcer, it will be proper to ſprinkle on the part ſome drying powders, ſuch as thoſe of maſtic, frankinceſe, ſarcocolla, colophony, lapis calaminaris, and tutty; applying, afterwards, to the place dry lint, and a plaſter accommodated to retain and hold together all the things applied, continuing the ſame till the place be perfectly whole and ſound: but if the luxuriant and fungous fleſh has already elevated itſelf above the reſt, above the ſkin, the beſt way to conſume it, is to rub it with blue vitriol; or, if this be not ſtrong enough, to ſprinkle on it ſome powder of red precipitate and burnt alum, till its growth be entirely ſuppreſſed, and nothing appears prominent. See the articles FUNGUS and CICATRIX.

In the laſt place, it is hardly to be expreſſed how much a prudent regimen in diet and manner of living contributes towards the incarning and conglutination of ulcers: for it has been an old obſervation of the profeſſors of the ſalutary art, that very bad ulcers have been cured by means of a regimen, without any conſiderable aſſiſtance from medicine; and, on the contrary, that the ſlighteſt and moſt contemptible ſores have, by a neglect of the rules of diet, and prepoſterous way of living, degenerated into very bad, and even incurable, ulcers. See the article REGIMEN.

Great care, therefore, is to be taken by every perſon troubled with an ulcer, to avoid ſalt, acrid, and acid food, and ſuch as is too fat or heating, with ſwine's fleſh, and all ſuch as is difficult of concoction.

If a bad habit of body be an impediment to the cure of an ulcer, the advice of a ſkilful phyſician is required, who, by the preſcription of proper internal medicines, may not only prevent an ulcer of a mild and favourable kind from becoming malignant, and perhaps incurable, but as much as poſſible promote and haſten its cure. See DIET.

In callous and fiſtulous ulcers, that have formed variety of ſinuſes, and when either nothing can be done by corroſive medicines, or elſe that they tear and corrode the nerves, and bring on convulſions, and other bad ſymptoms, before they affect the callus; in theſe caſes, the beſt and ſafeſt way is to lay open the ſinus, taking care not to wound the nerves, tendons, and arteries; and, after that, all the calluſes may be eaſily deſtroyed by the common methods. Or, if even this method ſhould not have the deſired effect, and if the patient has a conſiderable ſhare both of ſtrength and courage, and the ſituation of the nerves and arteries is favourable, the callous parts muſt be all either entirely cut out with the knife, or burned away by the actual cautery. See CALLUS.

When ulcers are attended with a large diſcharge, the acrimonious ſerum, wherewith the blood abounds, ſhould be evacuated by cathartic and diuretic medicines. Millepedes, in any form, are very properly preſcribed to be taken internally in theſe, as are alſo the eſſence of amber, myrrh, balſam of Peru, tincture of ſalt of tartar, tartarized tincture of antimony, and the like: large and frequent draughts of ſmall liquors are frequently the cauſe of theſe diſorders, and are therefore moſt carefully to be avoided; ſtrong ale, or old wine, ſhould be drank ſparingly at meals, and nothing between them. Such meats are beſt, on theſe occaſions,

caſions, as have feweſt juices in them, and are very well roaſted; and the external medicines muſt be thoſe which have the greateſt reputation as dryers. The principal of theſe are lime-water, lapis calaminaris, tutty, chalk, maſtic, frankincenſe, colophony, and native cinnabar; and when any of theſe have been ſprinkled in fine powder upon the ulcer, a plaſter of diapompholygos, or the like, is to be laid over it.

For the cleanſing venereal ulcers, Heiſter recommends the phagedenic water; or lime water, impregnated with calomel: either of theſe may be applied often every day, and the parts may alſo, if neceſſary, be touched with the cauſtic; and when they are thoroughly cleanſed, they may very ſucceſsfully be healed, either with an ointment made only of crude mercury mixed with turpentine, or with the following: take of the diapompholygos-ointment and crude mercury, killed with a ſmall quantity of Venice-turpentine, of each equal quantities; mix them in a glaſs-mortar into an ointment: or, take of the amalgama of lead and tin an ounce, of bole armenic two ounces; mix theſe, and make them into an ointment, by mixing with them a ſufficient quantity of ointment of roſes, or any other ſimple ointment, in a glaſs-mortar. If there be at the ſame time a caries of the bone, which is, indeed, too frequently the caſe, this is to be dreſſed with euphorbium, oil of cloves, phagedenic-water, or ſpirit of nitre with quick-ſilver diſſolved in it; or, if it can conveniently and ſafely be done, the actual cautery is of ſignal ſervice. See POX, BUBO, &c.

ULCERATION, or EXULCERATION, in ſurgery, a little hole in the ſkin, cauſed by an ulcer. See the preceding article.

ULEX, in botany, a genus of the *diadelphia-decandria* claſs of plants, with a papilionaceous flower; and an oblong turgid pod for its fruit, containing a few roundiſh and emarginated ſeeds.

This genus comprehends the geniſta ſpinoſa, or furze-buſh, and the geniſta ſparti[illegible] of authors.

ULFELDECK, a town of Brabant, eleven miles ſouth-eaſt of Mechlin.

ULIGINOUS, in agriculture, an appellation given to a moiſt, mooriſh, and fenny ſoil

ULLAGE, in gauging, is ſo much of a caſk, or other veſſel, as it wants of being full. See the article GAUGING.

The ullage of a veſſel, whoſe axis is parallel to the horizon, may be found thus: let AGBH (plate CCXCVI. fig. 1. n° 1.) be the great circle in the middle of the caſk, whoſe ſegment GBH is filled with liquor, the ſegment GAH being empty. The ſegment GBH is known, if the depth EB be known, and EH a mean proportional between the ſegments of the diameter AE and EB; all which are found by a rod or ruler put into the veſſel. Let the baſis of the caſk, at a medium, be found; which ſuppoſe to be the circle CKDL (*ibid.* n° 2.) and let the ſegment KCL be ſimilar to the ſegment GAH (which is either found by the rule of three, becauſe the circle AGBH: the circle CKDL:: the ſegment GAH: the ſegment KCL; or it may be found by the tables of ſegments made by authors) and the product of this ſegment, multiplied by the length of the caſk, will give the liquid content in the caſk; which being ſubtracted from the whole content, leaves the ullage AGH.

ULM, an imperial city of Swabia, in Germany, ninety miles ſouth weſt of Ratiſbon: eaſt long. 10°, north lat. 48° 24′.

ULMARIA, in botany, a ſpecies of filipendula. See the article FILIPENDULA.

ULMEN, a town of Germany, thirty miles north-eaſt of Triers.

ULMUS, the ELM, in botany, a genus of the *pentandria digynia* claſs of plants, without any coroſla: the fruit is a large oval drupe, containing a ſingle, roundiſh, and ſlightly compreſſed ſeed. See ELM.

ULNA, in anatomy, one of the bones of the fore-arm, reaching from the elbow to the wriſt: it is big at its upper extremity, and grows gradually ſmaller towards its lower end. See SKELETON.

This bone is longer than the radius, and has a motion of flexion and extenſion: at is upper extremity, it articulates with the os humeri and the criſta of the radius; and its lower extremity articulates with the carpus, as alſo with the radius by means of a criſta.

ULNA, an ell. See ELL and MEASURE.

ULNARIS, in anatomy, the name of two muſcles of the carpus, or hand; one called ulnaris internus, which is a flexor muſcle terminating in the internal ſiſicle of the carpus; and the other, called ulnaris externus, is an extenſor muſcle, terminating in the metacarpal bone that ſupports the little finger.

ULSTER, the moſt northern province of Ireland, the chief town of which is Londonderry.

ULTERIOR,

Fig. 1. ULLAGE

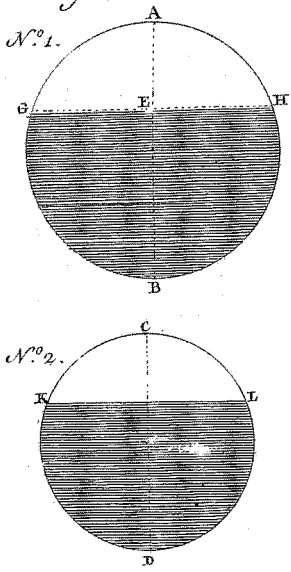
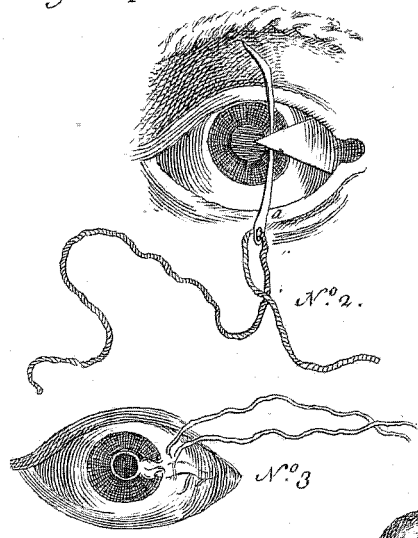


Fig. 2. Operation for the UNGUIS.



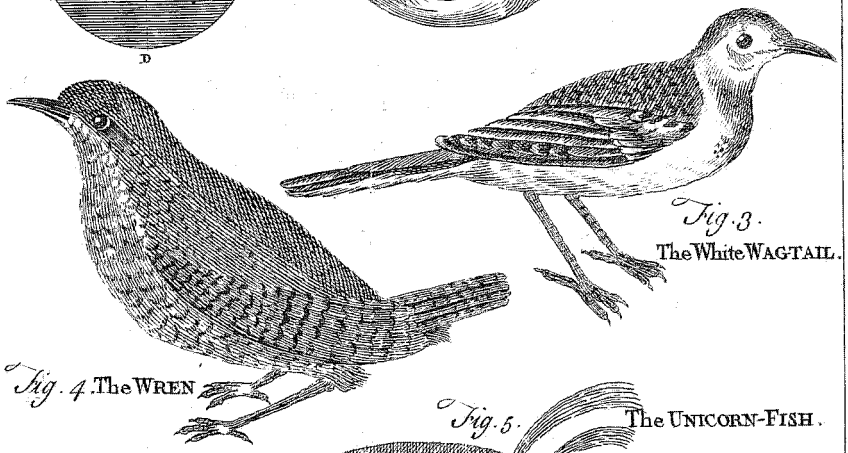


Fig. 3. The White WAG-TAIL.

Fig. 4. The WREN

Fig. 5. The UNICORN-FISH.

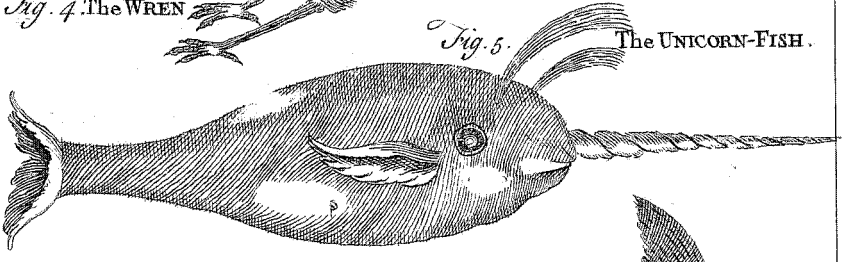
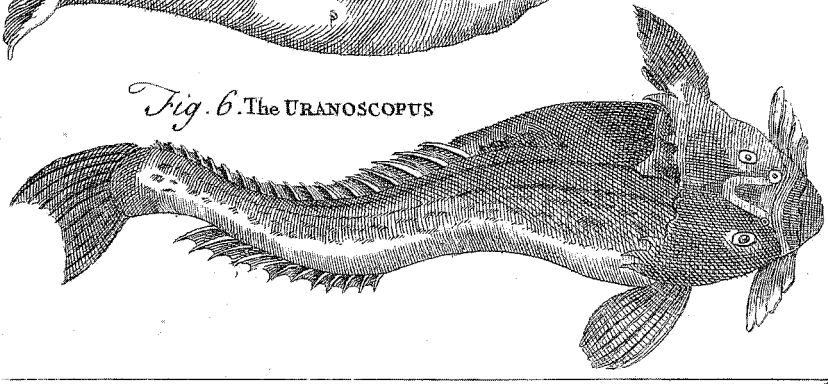


Fig. 6. The URANOSCOPUS



ULTERIOR, in geography, is applied to ſome part of a country or province, which, with regard to the reſt of that country, is ſituated on the farther ſide of the river, mountain, or other boundary, which divides the country into two parts. Thus Africa, with regard to Europe, is divided, by mount Atlas, into citerior and ulterior, *i. e.* into two portions, the one on this ſide mount Atlas, and the other on that.

ULTRAMARINE, *ultramarinum*, a beautiful blue colour uſed by the painters, prepared from lapis lazuli, by calcination. See the article LAZULI.

The german lapis lazuli does not anſwer well in this proceſs, and diſcovers itſelf by its calcining eaſier than the African or Aſiatic, and turning greeniſh. The oriental kind calcines to a finer blue than it naturally has, and retains the colour for ever. After calcining the ſtone in a clear fire of charcoal, they grind it to an impalpable powder on a porphyry, and then mixing it up in a paſte, compoſed of pitch, wax, and oil, they work it about with the hands; and, finally, kneading this in a veſſel of clear water, as the powder ſeparates from the viſcid matter, it ſinks to the bottom: when all that is perfectly fine in this is worked out, they let the water be drained off, and dry the powder for uſe. What remains embodied in the paſte, is afterwards ſeparated, and makes a worſe kind than the former; though even the very meaneſt ultramarine is a very beautiful colour.

Ultramarine muſt be choſen of an high colour, and well ground, which may be known by putting it between the teeth, and if it feel gritty, it is a ſign it has not been well ground.

To know whether it be pure and unmixed, put a little of it into a crucible, and ſo heat it red-hot; and if the powder has not changed its colour after this trial, it is certainly pure; on the contrary, if there be any change, or any black ſpecks in it, then it has been adulterated.

There is alſo a ſpurious ſort, called common or dutch ultramarine; which is only ſmalt well ground and pulverized. See the article SMALT.

ULTRAMONTANE, ſomething beyond the mountains.

The term is principally uſed in relation to Italy and France, which are ſeparated by the mountains of the Alps.

ULTRAMUNDANE, *ultramundanus*, beyond the world; is that part of the univerſe ſuppoſed to be without, or beyond, the limits of our world, or ſyſtem.

ULTZEN, a town of Lower Saxony, in Germany, twenty-five miles ſouth of Lunenburg.

ULVA, in botany, a genus of moſſes, conſiſting of a merely foliaceous ſubſtance, formed into long cylindrical tubes. This genus includes the tubular tremellæ, and with them all the ſmooth confervæ of authors. See the article MOSS.

ULVERSTON, a market-town of Lancaſhire, eleven miles north-weſt of Lancaſter.

ULULA, in ornithology, the grey owl, a ſpecies of ſtrix, with a circle of long feathers, compoſed of two rows, round its face. See OWL and STRIX.

UMA, a town of ſwediſh Lapland, ſituated at the mouth of a river of the ſame name, on the Bothnic gulph, two hundred and eighty miles north of Stockholm.

UMBELLÆ, *umbells*, among botaniſts, the round tufts or heads of certain plants ſet thick together and all of the ſame height.

UMBELLIFEROUS PLANTS, are ſuch as have their tops branched and ſpread out like an umbrella; on each little ſubdiviſion of which there is growing a ſmall flower; ſuch are fennel, dill, *&c.* This flower is always pentapetalous, and is ſucceeded by two naked ſeeds adjoining to each other, which are, according to Ray, the true characteriſtics that diſtinguiſh theſe plants from others.

UMBER, or UMBRE, *umbria*, among painters, *&c.* a kind of dry duſky-coloured earth, which, diluted with water, ſerves to make a dark-brown colour, uſually called with us a hair-colour. It is called umber, from *umbra*, a ſhadow, as ſerving chiefly for the ſhading of objects: or, rather, from Umbria, a country of Italy, whence it uſed to be brought.

UMBER, or GRAYLING, in ichthyology. See the article GRAYLING.

UMBILICAL, among anatomiſts, ſomething relating to the umbilicus, or navel. See NAVEL and ABDOMEN.

The umbilical veſſels are an aſſemblage of two arteries, a vein, and the urachus; which all together conſtitute what we call the funiculus umbilicalis, or navel-ſtring. See the article NAVEL.

The umbilical arteries ariſe from the iliacs, near their diviſion into external and

and internal; and pass thence, on each side of the bladder, through the navel, to the placenta.

The umbilical vein, from innumerable capillaries united into one trunk, descends from the placenta to the liver of the fœtus; where it is partly distributed into the porta, and partly into the cava.

The urachus is only plainly found in brutes; though there is no doubt but it has place, likewise, in mankind. See the article URACHUS, *&c.*

The use of these vessels is to maintain a continuity and communication between the mother and the fœtus. Some authors will have it, that the fœtus receives its food and increase this way, and that it grows like a vegetable from the mother as the root, of which the umbilical vessels are the stem; and the child the head or fruit of this plant animal. See FOETUS.

UMBILICAL POINTS, in mathematics, the same with foci.

UMBILICUS, the NAVEL, in anatomy. See the article NAVEL.

UMBONE, a name used by some for the style or pistil of a flower. See the articles FLOWER and PISTIL.

UMBRA, or SHADOW. See SHADOW.

UMBRA, in ichthyology, the sciæna, with the upper jaw longest, and the under one bearded. See the article SCIÆNA.

This is a large fish, being frequently five feet in length, and its weight sixty pounds: the ground colour is a dusky olive, with a bluish tinge, and variegated all over with a tinge of other colours: the teeth are small and slender, and there are a great many of them in the fauces, besides those in the jaws.

UMBRE, or UMBER, among painters. See the article UMBER.

UMBRINO, in ichthyology, the blackish variegated sciæna, with the belly-fins black. See the article SCIÆNA.

UMBRIATICA, a town of the hither Calabria, in the kingdom of Naples: east long. 17° 35′, north lat. 39° 15′.

UMPIRE, a third person chosen to decide a controversy left to arbitration. See the article ARBITRATION.

UNCASING, among sportsmen, signifies the cutting up, or flaying of a fox. See the article HUNTING.

UNCIA, in general, a latin term denoting the twelfth part of any thing; particularly the twelfth part of a pound, called in english an ounce; or the twelfth part of a foot, called an inch. See the articles MEASURE and WEIGHT.

UNCIÆ, in algebra, the numbers prefixed before the letters of the members of any power produced from a binomial, residual, or multinomial root. Thus, in the fourth power of $a+b$, viz. $a^4+4a^3b+6a^2b^2+4ab^3+b^4$, the unciæ are 4, 6, 4; being the same with what others call co-efficients. See BINOMINAL, INVOLUTION, and CO-EFFICIENT.

UNCIAL, *uncialis*, an epithet which antiquaries give to certain large sized letters or characters, antiently used in inscriptions and epitaphs. The word is formed from the latin *uncia*, the twelfth part of any thing, and which in geometrical measure signified the twelfth part of a foot, *viz.* an inch, which was supposed to be the thickness of the stem of one of those letters.

UNCORE, or UNQUES *prist, still ready*, in law, a plea for the defendant, being sued for a debt due on a bond, *&c.* at a day past, to save the forfeiture of his bond, *&c.* by affirming that he tendered the debt at the time and place, and that there was none to receive it, and that he is yet also ready to pay the same. See the article TENDER.

UNCTION, *unctio*, the act of anointing or rubbing with oil, or other fatty matter. The cure of divers wounds, ulcers, *&c.* greatly depend upon repeated unctions with oil, unguents, cerats, *&c.* For the mercurial unction applied to bring on a salivation, see the article SALIVATION.

UNCTION, in matters of religion, is used for the character conferred on sacred things, by anointing them with oil. Unctions were very frequent among the Hebrews. They anointed both their kings and high-priests at the ceremony of their inauguration. They also anointed the sacred vessels of the tabernacle and temple, to sanctify and consecrate them to the service of God. The unction of kings is supposed to be a ceremony introduced very late among the christian princes. It is said, that none of the emperors were ever anointed before Justinian, or Justin. The emperors of Germany took the practice from those of the eastern empire: king Pepin of France was the first who received the unction. In the antient christian church, unction always accompanied the ceremonies of baptism and confirmation. Extreme unction, or the anointing persons in the article of death, was also practised by the antient christians, in compliance with the precept of St. James, chap. v. 14 and

and 15 verſes; and this extreme unction the romiſh church has advanced to the dignity of a ſacrament. It is adminiſtered to none but ſuch as are afflicted with ſome mortal diſeaſe, or are in a decrepit age. It is refuſed to impenitent perſons, as alſo to criminals. The parts to be anointed are the eyes, the ears, the noſtrils, the mouth, the hands, the feet, and the reins. The laity are anointed in the palms of the hands, but prieſts on the back of it; becauſe the palms of their hands have been already conſecrated by ordination. The parts above-mentioned, are anointed in the form of a croſs. The prieſt begins anointing the ſick perſon's eyes, ſaying, "May God by his holy anointing, pardon you the ſins you have committed by the eyes." In like manner he proceeds to the other parts, varying the words according to the parts he anoints.

UNCUTH, *unknown*, is uſed, in the antient Saxon laws, for him that comes to an inn gueſt-wiſe, and lies there but one night, in which caſe his hoſt is not bound to anſwer for any offence he committed, whereof he was guiltleſs himſelf. See the article HOGENHINE.

UNDECAGON, is a regular polygon, of eleven ſides. See POLYGON.

UNDECEMVIR, a magiſtrate among the antient Athenians, who had ten other collegues or aſſociates joined with him in the ſame commiſſion. The function of the undecemviri at Athens, were much the ſame as thoſe of the prevots de marechauſſe in France: they took care of the apprehending of criminals, ſecured them in the hands of juſtice, and when they were condemned, took them again into cuſtody, that the ſentence might be executed on them. They were choſen by the tribes, each tribe naming its own; and as the number of tribes after Calliſthenes was but ten, which made ten members, a ſcribe or notary was added, which made the number eleven, whence their name οἱ ἕνδεκα, or undecemviri, as Cornelius Nepos calls them in the life of Phocion.

UNDE', UNDEE, or UNDY. See WAVY.

UNDER *the ſea*, in the ſea-language. A ſhip is ſaid to be ſo when ſhe lies ſtill, or waits for ſome other ſhips, with her helm laſhed, or tied up a-lee.

UNDER CURRENTS, currents diſtinct from the upper or apparent currents of the ſeas. Some naturaliſts conclude that there are in divers places under currents which ſet or drive a contrary way from the upper current, whence they ſolve the remarkable phænomena of the ſea's ſetting ſtrongly through the Streights into the Mediterranean, with a conſtant current twenty leagues broad; as alſo, that running from the Euxine through the Boſphorus into the Helleſpont, and thence into the Archipelago: they conjecture, that there is an under current whereby as great a quantity of water is carried out as comes in. To confirm this, it is obſerved, that between the north and ſouth foreland, it is either high or low water upon the ſhore three hours before it is ſo off at ſea; a certain ſign, that though the tide of flood runs aloft, yet the tide of ebb runs under foot, or cloſe by the ground. Yet Dr. Halley ſolves the currents ſetting in at the Streights without overflowing the banks, from the great evaporation, without ſuppoſing any under current. See the article SEA.

UNDER *chamberlain of the exchequer*, an officer that clears the tallies written by the clerk of the tallies, and reads the ſame, in order that the clerk of the pell and the comptrollers thereof may ſee their entries to be true: he likewiſe makes all ſearches for records in the treaſury, and has the cuſtody of domeſday book. See the article EXCHEQUER.

UNDER-SHERIFF, *&c.* See SHERIFF, *&c.*

UNDER *treaſurer of England*, was an officer ſaid to be firſt created by king Henry VII. whoſe duty was to cheſt up the king's treaſure at the end of every term, to note the content of the money in each cheſt, and ſee it carried to the king's treaſury for the eaſe of the lord treaſurer.

UNDERMINING. See SAPPING.

UNDERSTANDING, *intellectus*, is defined by the peripatetics to be a faculty of the reaſonable ſoul, converſant about intelligible things, conſidered as intelligible. They alſo make it twofold, *viz.* active and paſſive. Active underſtanding, they hold that faculty of the ſoul by which the ſpecies and images of intelligible things are framed, on occaſion of the preſence of phantaſms or appearances thereof. For maintaining the intellect to be material, they hold it impoſſible it ſhould be diſpoſed to think by any diſproportionable phantaſms of mere body, and therefore that it is obliged to frame other proportionate ſpecies of itſelf, and hence its denomination active. Paſſive underſtanding, is that which receiving the ſpecies framed by the active underſtanding,

ſtanding, breaks forth into actual knowledge. See the article KNOWLEDGE.

The moderns ſet aſide the peripatetic notion of an active underſtanding. The carteſians define the underſtanding to be that faculty whereby the mind converſing with, and, as it were, intent on itſelf, evidently knows what is true in any thing not exceeding its capacity. The corpuſcular philoſophers define the underſtanding to be a faculty expreſſive of things which ſtrike on the external ſenſes, either by their images or their effects, and ſo enter the mind. Their great doctrine is, *nihil eſſe in intellectu quod non prius fuerit in ſenſu*; and to this doctrine Mr. Locke, and moſt of the lateſt engliſh philoſophers, ſubſcribe. See the article IDEA.

Between the carteſians and corpuſcularians there is this farther difference, that the latter make the judgment to belong to the underſtanding, but the former to the will. Hence, according to the moſt approved opinion of the corpuſcularians, the underſtanding has two offices, *viz.* perception and judgment; according to the carteſians, it has only one, *viz.* perception. See the articles PERCEPTION, JUDGMENT, and WILL.

UNDERSTANDING is alſo uſed for the act, exerciſe, or exertion, of this faculty, or the action whereby the mind knows things, or repreſents them in idea to itſelf.

UNDERTAKERS, were antiently ſuch perſons as were employed by the king's purveyors, and acted as their deputies. At preſent the name is chiefly uſed for upholders, or perſons who furniſh out funerals, and alſo for ſuch as undertake any great work.

UNDERWALD, a canton of Switzerland, bounded by Switz and Lucern on the north, by Uri on the eaſt, and by another part of Lucern on the weſt; being about twenty-five miles long, and as many broad.

UNDERWOOD, *ſub-boſcus*, is coppice, or any wood that is not accounted timber. See COPPICE and TIMBER.

In the cutting the underwood of coppices, when the ſtubbles are great, they ſhould be ſtubbed up; for they only take up a great deal of room, and ſend up few ſhoots, their cracks and holes letting in water, and uſually half killing them. The taking up theſe ſhould be performed in winter, and the ſpaces they leave will be occupied by young trees: if not, a long branch of ſome neighbouring tree may be laid down, which will ſoon ſend up a ſufficient ſupply of ſuckers for the place. In felling the underwood, it is always proper to leave young trees enough, the worſt of which may be taken down the next fall, eſpecially if any of them grow near a great tree that will be fit to fell the next ſeaſon, becauſe they may be ſpoiled by its fall.

UNDULATION, in phyſics, a kind of tremulous motion or vibration obſervable in a liquid, whereby it alternately riſes and falls like the waves of the ſea. See the article WAVE.

This undulatory motion, if the liquid be ſmooth and at reſt, is propagated in concentric circles, as moſt people have obſerved upon throwing a ſtone, or other matter, upon the ſurface of a ſtagnant water, or even upon touching the ſurface of the water lightly with the finger, or the like. The reaſon of theſe circular undulations is, that by touching the ſurface with your finger, there is produced a depreſſion of the water in the place of contact. By this depreſſion, the ſubjacent parts are moved ſucceſſively out of their place, and the other adjacent parts thruſt upwards, which lying ſucceſſively on the deſcending liquid, follow it; and thus the parts of the liquid are alternately raiſed and depreſſed, and that circularly. When a ſtone is thrown into the liquid, the reciprocal vibrations are more conſpicuous: here the water, in the place of immerſion, riſing higher by means of the impulſe, or rebound, till it comes to fall again, gives an impulſe to the adjoining liquid, by which means that is likewiſe raiſed about the place of the ſtone as about a center, and forms the firſt undulous circle; this falling again, gives another impulſe to the fluid next to it, farther from the center, which riſes likewiſe in a circle; and thus ſucceſſively greater and greater circles are produced. See the article IMPULSE.

Undulatory motion is likewiſe applied to a motion in the air, whereby its parts are agitated after the like manner as waves in the ſea; as is ſuppoſed to be the caſe when the ſtring of a muſical inſtrument is ſtruck. This undulatory motion of the air is ſuppoſed the matter or cauſe of ſound. See the article SOUND.

UNGELD, in our antient cuſtoms, a perſon out of the protection of the law: ſo that if he were murdered, no geld or fine was to be paid, in the way of compenſation, by him that killed him.

UNGHWAR, a city of upper Hungary, ſituated near the foot of the Carpathian mountains:

mountains: east long. 21° 30′, north lat. 48° 40′.

UNGUENT, or OINTMENT, *unguentum*, in medicine and surgery, a topical remedy or composition, chiefly used in the dressing of wounds and ulcers. See the articles WOUND and ULCER.

Unguents are divided into simple and compound, though it so happens that some of the former are considerably compounded; and amongst the latter there are some simple unguents, and others very little compounded. Unguents, liniments, and cerates, are external forms applied on divers parts of the body, both to cure, to ease, and to relieve them. These only differ from each other in their consistence; with regard to which, unguents hold the medium, being stiffer than liniments, but softer than cerates. Oils are the bases of all the three, to which are added wax axungia, and several parts of plants, animals, and minerals, both on account of the virtues they furnish, and to give a consistence to the oils, and to keep them longer on the part, that they may have more time to act. See CERATE and LINIMENT.

Any of the officinal plasters, diluted with so much oil as will reduce it to the thickness of stiff honey, forms an ointment; by further increasing the oil it becomes a liniment. See PLASTER.

There are some considerable compositions of this form in the intention of emollients: and amongst the compound unguents there are some which take in a number of very warm aromatic ingredients, and seem designed for paralytic infirmities, and cases that require brisk attenuating applications. At the head of the emollient unguents, is the unguentum dialthææ; and among the attenuating ones, the most in esteem is the unguentum martiatum and nervinum. There are ointments also within the intention of strengtheners; and the next intention of any consequence for which we are provided by this form, and which seems as suitable to it as any, is against cutaneous foulnesses, as the itch, and such like distempers; and this seems to be the reason that there is such a choice of them now given. But though most of these have the reputation of great antiquity, and hold their places in abundance of officinal dispensatories down to the present, yet they are so uncleanly in use, that they are almost altogether fallen into neglect, unless in some of our hospitals; those which contain mercury being much more neat and efficacious for the same purpose. Some other things of this division are little else than oils brought into ointments, by the exchange of oil for lard. Pomatums are also ranked among the number of ungents. See the article POMATUM, *&c.*

UNGUIS, a latin term, signifying a nail of the hand or foot. See NAIL.

UNGUIS, PANNUS, or PTERYGIUM, in medicine and surgery, a preternatural membrane formed upon the coats of the eye, so as to extend itself over the cornea and pupil, and obstruct the sight.

An unguis of the eye happens when the blood-vessels of the tendinous tunic in the corners of the eyes are turgid with blood, through an obstruction or inflammation. When this distemper encreases, there is a sort of carnous web which covers the eye in whole or in part, insomuch that the eyes are offended with the light, and look red sometimes: the web is thin and white, sometimes thicker and more fleshy, rough, obscure and painful; nay, sometimes it becomes cancerous, which is incurable, and ought not to be touched. In the cure, this preternatural coat is to be removed or taken off by abstergent and gently corroding medicines, or by the hand of a surgeon. The medicines in use are sugar-candy, honey, white-wine, bone of the cuttle-fish, burnt hartshorn, and calcined egg-shells; as also water of eye-bright, the great celandine, and the fennel, in which crocus metalorum may be infused: particularly the gall of pike dissolved in a proper water; that is, two ounces to one of the gall. Some recommend a water distilled from the dung of young geese in April. If the disorder be obstinate, the juice of the greater celandine may be used diluted in fennel-water. The following collyrium is proper: Take of prepared lapis hæmatitis, half a scruple; of white-vitriol, twenty-five grains; of myrrh and saffron, each five grains; of white-sugar candied, one scruple. Reduce this mixture to a powder, and then mix it with equal parts of the waters of roses, eye-bright, and fennel, and apply it to the eye with a feather, taking care not to injure the pupil. If these methods are insufficient for destroying the pellicle, it must then be extirpated; in order to which, the patient being in a proper posture, the surgeon takes the small hook (plate CCXCVI. fig. 2. n° 1.)

and endeavours to paſs its point under the thickeſt end looſeſt part of the pellicle; and endeavours, by this means, to elevate it a little. In the next place he takes the needle *a* (*ibid.* n° 2.) armed with a thread, and paſſing it under the pellicle, ties it with a double knot; and then faſtening the two ends in a loop, (*ibid.* n° 3.) he thereby attempts to make a gentle elevation. This done, he endeavours to ſeparate the upper and lower margin of the membrane with a lancet, that he may afterwards cut off the reſt immediately in a ſtraight line near the lacrymal caruncle, by a pair of ſmall and ſtraight ſciſſars: he then draws back the thread and membrane towards the cornea; and if it adheres any where to the eye, frees it by degrees with a ſcalpel or ſciſſars; in doing which he muſt take care not to injure the cornea, and obſerve that no part of the membrane be left adhering to the eye, though it is better to have ſome part of the unguis adhering to the cornea, when the ſeparation is difficult, than to wound the cornea and leave ſcars in it; becauſe any ſmall portion of the membrane left behind may be taken off afterwards by heating the eye with gentle eſcharotics.

UNGUIS, in anatomy, is applied to two bones of the noſe, being as thin as ſcales, and reſembling the nail; whence their name. The ungues are the ſmalleſt bones in the upper jaw, and are ſituated near the great canthus of the eyes. Some authors call them oſſa lacrymalia; others, orbitaria-oſſa. They are contiguous to four other bones, *viz.* the coronal; that of the noſe; the maxillary; and that part of the ethmoides which forms the orbit.

UNGUIS, among botaniſts, the narrow part where the petals are inſerted when ſeveral go to make up the flower, as the broader part towards the end is called bractea.

UNGUIS ODORATUS, the NAIL-LIKE SWEET SHELL, in pharmacy, a medicine famous among the antients; but has, for a long time, been out of credit: and the conſequence of the neglect that has been ſhewn it is the loſing its real hiſtory, and the miſtaking different ſubſtances of the ſame origin and nature, though the produce of different animals, for it. We call what we ſuppoſe to be the unguis odoratus of the antients, blatta byzantia; the truth is, however, that our blatta byzantia, or ſweet-hoof, is not the ſame with the unguis odoratus of the antients, though nearly allied to it. The true unguis odoratus of the antients, is a thin, flat, teſtaceous ſubſtance, of an oblong or oval figure, rounded at both ends, and marked on the ſurface with three or four concentric circles, or oval lines: its colour is a duſky-brown with ſome admixture of the orange, ſometimes of a purpliſh tinge: its uſual ſize is that of a full grown nail of a man's thumb, and its thickneſs about the ſame with that of the nail: it is tough, flexile, and elaſtic; and has no peculiar ſmell or taſte. Beſides this genuine unguis odoratus, they had another ſmaller kind: both are the opercula of ſhells of the murex kind, frequent in the Red-ſea. The blatta byzantia is alſo the operculum or cover of a murex, as well as the unguis odoratus; but it belongs to a different ſpecies of that genus: there are alſo two kinds of the blatta byzantia, which are naturally without ſmell and taſte.

UNGULA, in geometry, the ſection of a cylinder cut off by a plane paſſing obliquely through the plane of the baſe and part of the cylindric ſurface.

UNGULA, in natural hiſtory, the claw or hoof of a quadruped. See HOOF.

UNICORN, *μονοκερως*, an animal, famous among the antients, but looked on by the moderns as fabulous, denominated from its diſtinguiſhing characteriſtic of having one horn only, which is repreſented as five palms long, and growing in the middle of the forehead. It is alſo ſaid to be about the ſize of an horſe: its hair ſhort, and of a darkiſh brown colour, very timorous, and therefore keeping moſtly in the woods. Some will have it an amphibious animal, and its horn moveable at pleaſure. Others make all its ſtrength to conſiſt in its horn; and add, that when purſued by the hunters, it precipitates itſelf from the top of the higheſt rocks, and pitches upon its horn, which ſuſtains the whole effort of its fall, ſo that it receives no damage thereby. It is added, that it is wonderfully fond of chaſte perſons; and therefore, in order to take it, a virgin is placed in its way, whom, when the unicorn ſpies, he lies down by her, lays his head in her lap, and falls aſleep; upon which, the virgin making a ſignal, the hunters come in and take the beaſt; which could never be caught by any other means, becauſe it would either caſt itſelf from a rock or die.

The

The unicorn is one of the ſupporters of the britiſh arms. It is repreſented by heralds paſſant, and ſometimes rampant. When in this laſt action, as in the britiſh arms, it is properly ſaid to be ſaillant. Argent, an unicorn ſejant ſable, armed and unguled, or, borne by the name of harding.

UNICORN-FISH, in ichthyology, a ſpecies of the monodon, or narwal, an extremely ſingular fiſh; the length of a full-grown one being about five and twenty feet, but commonly from ſixteen to twenty: it has only one tooth, remarkably long, which is fixed in the upper jaw, and runs parallel with the length of the fiſh, ſo that it has more the appearance of a horn than a tooth. See the article NARWAL.

The diameter of this fiſh equals, at leaſt, half its length, whence it is very unwieldy: the head is ſmall, and ſhaped like that of a roach: there is no fin on the back; and the fiſtule is in the vertex or uppermoſt part of the head. The tooth grows to ten, or more, feet in length, is about the thickneſs of a man's wriſt towards the baſe, and thence becomes gradually ſmaller all the way to the point. See plate CCXCVI. fig. 5.

UNIFOLIUM, in botany, the ſame with convallaria. See CONVALLARIA.

UNIFORM denotes a thing to be ſimilar, or conſiſtent, either with another thing or with itſelf, in reſpect of figure, ſtructure, proportion, and the like; in which ſenſe it ſtands oppoſed to difform. See the article DIFFORM.

Thus the uniform flowers of plants are ſuch as are of the ſame figure all around, having their fore and back parts, as alſo their right and left parts, exactly alike. For uniform motion, &c. ſee MOTION and EQUABLE.

UNIFORMITY, a ſimiltiude, or reſemblance, between the parts of a whole: ſuch is that we meet with in figures of many ſides, and angles reſpectively equal, and anſwerable to each other.

This term is particularly applied to one and the ſame form of public prayers and adminiſtration of ſacraments, and other rites, &c. of the church of England, preſcribed by the famous ſtat. 1 Eliz. and 14 Car. II. called the act of uniformity.

UNIOLA, in botany, a genus of the *triandria-digynia* claſs of plants, the corolla whereof conſiſts of a bivalve glume: the valves are of a lanceolato-compreſſed figure, like thoſe of the cup: the inner valve appears ſomewhat higher than the outer one: the corolla performs the office of a pericarpium, incloſing the ſeed, which is ſingle, and of an ovated oblong figure.

UNION, a junction, coalition, or aſſemblage of two or more different things in one.

UNION, among painters, expreſſes a ſymmetry and agreement between the ſeveral parts of a painting, when, *e.gr.* there is a great deal of relation and connection between them, both as to the figuring and colouring; ſo that they apparently conſpire to form one thing.

UNION, in architecture, may denote a harmony between the colours in the materials of a building.

UNION, in an eccleſiaſtical ſenſe, denotes a combining or conſolidating of two churches into one. There are two kinds of this union, as when one church is made ſubject to another, and one parſon is made rector of both; and where a conventual church is made a cathedral. In caſe two churches were ſo ſmall as that the tithes did not make a competent proviſion for each of the parſons, they might be united at common law before any act of parliament was made for that purpoſe. By ſtatute there may be an union of two churches where they lie not above a mile diſtant from each other, and where the value of the one exceeds not ſix pounds a year in the king's books of firſt fruits; which is done by the conſent of the biſhop, the patron, and incumbent. Alſo, in cities or corporate towns, it is ordained, that the biſhop, the patron, and the mayors, or chief magiſtrates of the place, &c. may unite pariſh-churches therein: yet, when the income of the church is above one hundred pounds *per annum*, there the major part of the pariſhioners are to agree to the ſame; and after the union, the patrons of thoſe churches ſhall preſent by turns, &c. but notwithſtanding each of the pariſhes continue diſtinct as to rates, charges, &c.

UNION, or the UNION, by way of eminence, is more particularly uſed to expreſs the act whereby the two ſeparate kingdoms of England and Scotland were incorporated into one, under the title of the kingdom of Great-Britain. This happy union, in vain attempted by king James I. was at length effected in the year 1707, by the general conſent of the queen and the eſtates of each realm. The

chief articles of this union are, That the two kingdoms ſhall be united into one kingdom, by the name of Great-Britain: that they, in conſequence thereof, be repreſented by one parliament, of which ſixteen peers and forty-five commoners are to be elected for Scotland, and have the ſame privileges with thoſe of England: that the ſubjects of either nation ſhall have equal freedom of trade, and be liable to the ſame cuſtoms, and the like laws for public government, &c. The kirk, or church of Scotland, is confirmed; and the courts of juſtice are to remain the ſame as they were before the union, yet ſubject to regulation, &c. A court of exchequer is alſo erected in Scotland, to be a court of record, revenue, and judicature, for ever; and barons of the ſaid court are appointed, who ſhall be the judges there, &c. See PEER, PARLIAMENT, &c.

UNISON, in muſic, the effect of two ſounds which are equal in degree of tune, or in point of gravity and acuteneſs. See the article TUNE.

Uniſon may be defined a conſonance of two ſounds produced by two ſtrings, or other bodies, of the ſame matter, length, thickneſs, tenſion, &c. equally ſtruck, and at the ſame time: ſo that they yield the ſame tone or ſound. See the article SOUND.

Uniſon is the firſt and greateſt of concords, and the foundation of all the reſt, according to Ariſtoxenus and moſt of the antients: yet ſome deny it to be any concord at all, maintaining it to be only that in ſounds which unity is in numbers. Others reſtrain the word concord to intervals, and make it include a difference of tune; but this is precarious: for as the word concord ſignifies an agreement of ſounds, it is certainly applicable to uniſons of the firſt degree.

But though uniſonance, or an equality of tune, makes the moſt perfect agreement of ſound, it is not true, that the nearer any two ſounds come to an equality of tune, they are the more agreeable. The mind is delighted with variety; and the reaſon of the agreeableneſs or diſagreeableneſs of two ſounds muſt be aſcribed to ſome other cauſe than the quality or inequality of the number of their vibrations. It is a famed phænomenon in muſic, that an intenſe ſound being raiſed, either with the voice or ſonorous body, another ſonorous body near it, whoſe tune is either uniſon or octave to that ſound, will ſound its proper note, uniſon or octave, to the given note. The experiment is eaſily tried by the ſtrings of two inſtruments, or by a voice and harpſichord; or a bell, or even a drinking-glaſs.

This our philoſophers account for thus; one ſtring being ſtruck, and the air put in motion thereby, every other ſtring, within the reach of that motion, will receive ſome impreſſion therefrom: but each ſtring can only move with a determinate velocity of recourſes or vibrations; and all uniſons proceed from equal or equidiurnal vibrations; and other concords, from other proportions. The uniſon ſtring then, keeping equal pace with the ſounding ſtring, as having the ſame meaſure of vibrations, muſt have its motion continued, and ſtill improved, till its motion become ſenſible, and it gives a diſtinct ſound. Other concording ſtrings have their motion propagated in different degrees, according to the frequency of the coincidence of their vibrations, with thoſe of the ſounded ſtring; the octave, therefore, moſt ſenſibly: then in the fifth; after which the croſſing of the motions prevents any effect.

This they illuſtrate by the pendulum, which, being ſet a moving, the motion may be continued, and ſtill improved, and augmented, by making frequent, light, coincident impulſes; as blowing on it when the vibration is juſt finiſhed: but if it be touched by any croſs or oppoſite motion, and this too frequently, the motion will be interrupted and ceaſe altogether. So of two uniſon-ſtrings, if the one be forcibly ſtruck, it communicates motion by the air to the other: and being equidiurnal in their vibrations, that is, finiſhing them preciſely together, the motion of the other will be improved and heightened by the frequent impulſes received from the vibrations of the firſt; becauſe given preciſely, when that other has finiſhed its vibration and is ready to return: but if the vibration of the chords be unequal in duration, there will be a croſſing of motions leſs or more, according to the proportion of the inequality; by which the motion of the untouched ſtring will be ſo checked as never to be ſenſible. And this, we find, is the caſe in all conſonances, except uniſon, octave, and the fifth.

UNIT,

UNIT, UNITE, or UNITY, in arithmetic, the number one, or one ſingle individual part of diſcrete quantity. See the article NUMBER.

UNITED NETHERLANDS conſiſt of the provinces of Holland, Zealand, Frieſland, Groningen, Overyſſel, Gelderland, with Zutphen and Utrecht; theſe are bounded by the German ſea on the north and weſt; by the circle of Weſtphalia on the eaſt, and by Flanders, Brabant, and the dutchy of Cleves on the ſouth; lying between 3° 20′ and 7° 30′ eaſt longitude, and between 51° 35′ and 52° 40′ north latitude; being about fifty miles long, and as many broad, including the Zuyder-ſea, which takes up a conſiderable ſpace within theſe limits. See NETHERLANDS, PROVINCES, ZEALAND, &c.

UNITY, in poetry. In the drama there are three unities to be obſerved, *viz.* the unity of action, that of time, and that of place. In the epic poem, the great, and almoſt only, unity, is that of the action. Some regard, indeed, ought to be had to that of time; that of place there is no room for. The unity of character is not reckoned among the unities. See EPIC, &c.

The unity of the dramatic action conſiſts of the unity of the intrigue in comedy, and that of the danger in tragedy; and this not only in the plan of the fable, but alſo in the fable extended and filled with epiſodes. See COMEDY, &c.

The epiſodes are to be worked in without corrupting the unity, or forming a double action; and the ſeveral members are to be ſo connected together, as to be conſtent with that continuity of action ſo neceſſary to the body, and which Horace preſcribes, when he ſays,

Sit quodvis ſimplex duntaxat & unum.

See the article EPISODE.

The unity of the epic action, Mr. Dacier obſerves, does not conſiſt in the unity of the hero, or in the unity of his character and manners, though theſe be circumſtances neceſſary thereto. The unity of action requires that there be but one principal action, of which all the reſt are to be incidents or dependencies. See ACTION. F. Boſſu aſſigns three things requiſite thereto; the firſt, that no epiſode be uſed but what is fetched from the plan and ground of the action, and which is a natural member of that body; the ſecond, that the epiſodes and members be well connected with each other; the third, is not to finiſh any epiſode, ſo as it may appear a whole action, but to let each be always ſeen in its quality of member of the body, and an unfiniſhed part.

UNITY *of poſſeſſion*, in law, ſignifies a joint poſſeſſion of two rights by ſeveral titles.

UNIVERSAL, ſomething that is common to many things; or it is one thing belonging to many, or all things.

In logic, univerſal is either complex or incomplex. A complex univerſal is either an univerſal propoſition, as every whole is greater than its part; or whatever raiſes a manifold conception in the mind, as the definition of a reaſonable animal. An incomplex univerſal, is what produces only one conception in the mind, and is a ſimple thing reſpecting many; as human nature, which relates to every individual wherein it is found.

UNIVERSALITY, that quality which denominates a thing univerſal. See the preceding article.

UNIVERSE, a collective name, ſignifying the whole world, or the aſſemblage of heaven and earth, with all things therein. See HEAVEN and EARTH.

As ſpace is, in its own nature, every way infinite, it gives us an idea of the infinity of the univerſe, which can therefore be only in part comprehended by us: and that part of the univerſe which we can have any notion of, is that which is the ſubject of our ſenſes; and of this the eye preſents us with an idea of a vaſt extended proſpect, and the appearance of various ſorts of bodies diſſeminated thro' the ſame.

The infinite abyſs of ſpace, which the Greeks call τὸ κενὸν, the Latins *inane*, and we the univerſe, does undoubtedly comprehend an infinity of ſyſtems of moving bodies round one very large central one, which the Romans called *ſol*, and we the ſun. This collection of bodies is therefore properly called the ſolar ſyſtem, and ſometimes the mundane ſyſtem, from the latin word *mundus*, the world. See the article SYSTEM.

That the univerſe contains as many ſolar ſyſtems or worlds, as there are what we call fixed ſtars, ſeems reaſonable to infer from hence, that our ſun, removed to the diſtance of a ſtar, would appear juſt as a ſtar does, and all the bodies moving about it, would diſappear entirely. Now the reaſon why they diſappear, is because they are opake bodies, and too ſmall to be ſeen at ſo great a diſtance, without an intenſe degree of light; whereas theirs is the weakeſt that can be, as being firſt borrowed,

borrowed, and then reflected to the eye. See the article STAR.

But the ſun, by reaſon of his immenſe bulk and innate light, which is the ſtrongeſt poſſible, will be viſible at an immenſe diſtance; but the greater the diſtance, the leſs bright it will appear, and of a leſſer magnitude: and therefore every ſtar of every magnitude, may probably be a ſun like our own, informing a ſyſtem of planets, or moving bodies, each of which may be inhabited like our earth, with various kinds of animals, and ſtored with vegetable and other ſubſtances.

We can perceive, ſays Mr. Mac Laurin, no bounds of the vaſt expanſe in which natural cauſes operate; nor can we fix any border or termination of the univerſe; and we are equally at a loſs to trace things to their elements, and to diſcover the limits which incloſe the ſubdiviſions of matter. The objects, which we commonly call great, vaniſh when we contemplate the vaſt body of the earth: the terraqueous globe itſelf is ſoon loſt in the ſolar ſyſtem; being in ſome parts ſeen as a planet, or diſtant ſtar; and, in great part of the ſyſtem unknown, or viſible only at rare times to vigilant obſervers, aſſiſted perhaps with inſtruments like our teleſcopes. The ſun itſelf dwindles into a ſtar: ſaturn's vaſt orbit, and the orbits of all the comets, croud into a point, when viewed from numberleſs places between the earth and the neareſt fixed ſtars. Other ſuns illuminate other ſyſtems, where our ſun's rays are unperceived: but all theſe alſo are ſwallowed up in the vaſt expanſe of the univerſe. Even all the ſyſtems of the ſtars that ſparkle in the cleareſt ſky, muſt poſſeſs a ſmall corner only of that ſpace over which ſuch ſyſtems are diſperſed. And after we have riſen ſo high, and left all definite meaſures ſo far behind us, we find ourſelves no nearer to a term or limit; for all this is nothing to what may be diſplayed in the infinite expanſe, beyond the remoteſt ſtars that ever have been diſcovered.

In this view of the univerſe, an auguſt idea ariſes in the mind, worthy of the infinite and wiſe author of nature, who can never be ſuppoſed to have created ſo many glorious orbs, to anſwer ſo trifling a purpoſe as the twinkling to mortals by night now and then; beſides that the far greateſt part of the ſtars are never ſeen by us at all, as has been ſhewn under STAR.

UNIVERSITY, *univerſitas*, a collective term, applied to an aſſemblage of ſeveral colleges, eſtabliſhed in a city, or out town, wherein are profeſſors in the ſeveral ſciences, appointed to teach them to ſtudents; and where degrees or certificates of ſtudy in the divers faculties are taken up. See ART and SCIENCE.

In each univerſity four faculties are uſually taught, theology, medicine, law, and the arts and ſciences. See the article THEOLOGY, *&c.*

They are called univerſities, or univerſal ſchools, by reaſon the four faculties are ſuppoſed to take in the whole compaſs of ſtudy. See FACULTY.

In the eye of the law, an univerſity is held a mere lay body, or community; though, in reality, it be a mixed body, compoſed partly of laymen, and partly of eccleſiaſtics. See COMMUNITY, *&c.*

Univerſities had their firſt riſe in the XIIth and XIIIth centuries. Thoſe of Paris and Bologna pretend to be the firſt that were ſet on foot; but then they were on a different footing from the univerſities among us. See SEMINARY and SCHOOL.

Our own univerſities, of Oxford and Cambridge, ſeem intitled to the greateſt antiquity of any in the world; and Baliol and Merton colleges in Oxford, and St. Peter's in Cambridge, all made colleges in the XIIIth century, may be ſaid to be the firſt regular endowments of this kind in Europe.

For though Univerſity college in Cambridge had been a place for ſtudents ever ſince the year 872, yet this, like many of the other antient colleges beyond ſea, and Leyden to this day, was no proper college; but the ſtudents, without any diſtinction of habit, lived in citizens houſes, having only meeting places to hear lectures and diſpute.

In after-times there were houſes built for the ſtudents to live in ſociety; only each to be at his own charge, as in the inns of courts: theſe, at firſt, were called inns, but now halls. At laſt, plentiful revenues were ſettled on ſeveral of theſe halls, to maintain the ſtudents in diet, apparel, *&c.* and theſe were called colleges. See OXFORD, CAMBRIDGE, and COLLEGE.

The univerſities of Oxford and Cambridge are governed, next under the king, by a chancellor, who is to take care of the government of the whole univerſity, to maintain the liberties thereof, *&c.* Under him is the high-ſteward, whoſe office is to aſſiſt the chancellor, and other officers,

officers, when required, in the execution of their offices, and to hear and determine capital cauſes, according to the laws of the land, and the privileges of the univerſity. The next officer is the vice-chancellor, who officiates for the chancellor in his abſence. There are alſo two proctors, who aſſiſt in the government of the univerſity, particularly in the buſineſs of ſchool-exerciſe, taking up degrees, puniſhing violators of the ſtatutes, *&c.* Add to theſe a public orator, keeper of records, regiſter, beadles, and verger. The univerſities of Scotland are four, *viz.* thoſe of St. Andrews, Aberdeen, Edinburgh, and Glaſgow. See the articles *St.* ANDREW'S, ABERDEEN, *&c.* In Ireland there is only one univerſity, *viz.* that of Dublin. See DUBLIN.

UNIVOCAL, in the ſchools, is applied to two or more names, or terms, that have but one ſignification, in oppoſition to equivocal, which is where one term has two or more ſignifications. See EQUIVOCAL. Our univocal terms are ſuch, whoſe name as well as nature, is the ſame, in oppoſition to equivocals, whoſe names are the ſame, but their natures very different.

The antients believed that all perfect animals were produced by univocal generation; that is, by the ſole union or copulation of a male and female of the ſame ſpecies or denomination; and that inſects were produced by equivocal generation, without any ſeed, and merely of the corruption of the earth, exhaled, and, as it were, impregnated, by the ſun's rays: but this doctrine of inſects is now exploded. See GENERATION.

UNLAWFUL, illegal, ſomething prohibited by, or contrary to, the terms of law, either divine or human. See LAW.

UNLAWFUL ASSEMBLY, the meeting of three or more perſons together, by force to commit ſome unlawful act, as to aſſault any perſon, to enter his houſe or land, *&c.* and thus abiding together, whether they attempt the execution or not. See the article RIOT.

UNLIMITED, or INDETERMINATE PROBLEM, is ſuch a one as is capable of infinite ſolutions. See PROBLEM.

UNMOOR, a term uſed at ſea: when a veſſel which was riding at anchor weighs the ſame, or gets it up, in order to ſail, they ſay ſhe is unmooring.

UNNA, a town of Weſtphalia, thirty-five miles ſouth of Munſter, ſubject to the king of Pruſſia.

UNNA is alſo a river of Boſnia, forming part of the boundary between Chriſtendom and Turky, and falling into the Save.

UNSEELING, in falconry, is the taking away the thread that runs through a hawk's eye-lids, and hinders its ſight.

VOCABULARY, *vocabularium*, in grammar, denotes the collection of the words of a language, with their ſignifications, otherwiſe called a dictionary, lexicon, or nomenclature. See DICTIONARY, *&c.* A vocabulary is properly a leſſer kind of dictionary, which does not enter ſo minutely into the origins and different acceptations of words. See WORD.

VOCAL, ſomething that relates to the voice or ſpeech: thus vocal muſic is that ſet to words, eſpecially verſes, and to be performed by the voice, in contradiſtinction to inſtrumental muſic, compoſed only for inſtruments, without ſinging. See the articles VOICE, VERSE, *&c.*

VOCATIVE, in grammar, the fifth ſtate or caſe of nouns. See the articles NOUN and CASE.

When we name the perſon we are ſpeaking to, or addreſs ourſelves to the thing we are ſpeaking of, as if it were a perſon, the noun, or name, requires a new relation, which the Latins and Greeks expreſs by a new termination, called the vocative; as from *dominus, a lord*, is formed the vocative *domine, o lord.*

In engliſh, and moſt of the modern languages, the vocative is expreſſed in nouns that have an article in the nominative, by omitting that article; as, *the Lord is my hope; Lord, thou art my hope:* though, on many occaſions, we uſe an interjection.

VOGHERA, a town of the dutchy of Milan, in Italy, fifteen miles ſouth-weſt of Pavia.

VOICE, *vox*, a ſound produced in the throat and mouth of an animal, by an apparatus of inſtruments for that purpoſe. See the article SOUND.

Voices are either articulate or inarticulate. Articulate voices are thoſe whereof ſeveral conſpire together to form ſome aſſemblage or little ſyſtem of ſounds; ſuch are the voices expreſſing the letters of an alphabet, numbers of which joined together, form words. Inarticulate voices are ſuch as are not organized, or aſſembled into words; ſuch is the barking of dogs, the braying of aſſes, the hiſſing of ſerpents, the ſinging of birds, *&c.*

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The formation of the human voice, with all the varieties thereof obſerved in ſpeech, muſic, &c. makes a very curious article of inquiry; and the apparatus and organiſm of the parts adminiſtring thereto, is ſomething exceedingly ſurpriſing. Thoſe parts are the trachea or wind-pipe, through which the air paſſes and repaſſes into the lungs; the larynx, which is a ſhort cylindric canal at the head of the trachea; and the glottis, which is a little oval cleft or chink left between two ſemicircular membranes ſtretched horizontally withinſide the larynx; which membranes, though capable of joining cloſe together, do generally leave an interval, either greater or leſs, between them, called the glottis. A particular deſcription of each part may be ſeen under the articles TRACHEA, LARYNX, and GLOTTIS.

The long canal of the trachea, terminated at top with the glottis, appears ſo like a flute, that the antients made no doubt but the trachea contributed the ſame to the voice, as the body of the flute does to the ſound of that inſtrument. Galen himſelf fell in ſome meaſure into the miſtake; he perceived, indeed, that the principal organ of the voice was the glottis, but he ſtill allowed the trachea a conſiderable ſhare in the production of the ſound. Galen's opinion was followed by all the antients after him, and even by all the moderns before M. Dodart: but that author obſerves, that we do not either ſpeak or ſing when we inſpire or take in the air, but only when we expire or expel it; and that the air coming out of the lungs, paſſes always out of the minuter veſſicles of that part into larger, and at laſt into the trachea itſelf, which is the largeſt of all: that thus its paſſage becoming ſtill more free and eaſy, and thus more than ever in the trachea, it can never undergo ſuch a violence, and acquire ſuch a velocity in that canal, as is required to the production of ſound: but that as the aperture of the glottis is very ſmall, in compariſon with the width of the trachea, the air can never get out of the trachea by the glottis, without a vaſt compreſſion and augmentation of its velocity; and that by this means in paſſing, it communicates a briſk agitation to the minute parts of the two lips of the glottis, and gives them a kind of ſpring, and occaſions them to make vibrations, which communicated to the paſſing air, are what really occaſion the ſound. The ſound thus formed, proceeds into the cavity of the mouth and noſtrils, where it is reflected and refounds; and on this reſonance, M. Dodart ſhews, it is that the agreeableneſs of the voice intirely depends. The different conſiſtences, forms, &c. of the divers parts of the mouth, contribute to the reſonance, each in their way; and from this mixture of ſo many different reſonances in their due proportion, there reſults an harmony in the human voice inimitable by any muſician. Hence it is, that when any of theſe parts are diſordered, *e. g.* when the noſe is ſtopped, the voice becomes diſpleaſing. This reſonance in the cavity of the mouth, does not ſeem to conſiſt in a ſimple reflection, ſuch as that of a vault, &c. but in a reſonance proportionate to the tones of the ſound ſent into the mouth from the glottis; and accordingly we find this cavity to lengthen and ſhorten itſelf, according to the depth or acuteneſs of the tone. See the articles SOUND, TONE, &c.

As the organs that form the voice make a kind of wind inſtrument, one might imagine to find ſome proviſion therein anſwerable to that which produces the difference of tones in ſome other wind-inſtruments. The tone, therefore, muſt be attributed either to the mouth and noſtrils, which occaſion the reſonance, or to the glottis, which produces the ſound: and as all the different tones are produced in man by the ſame inſtrument, it follows, that the part which produces them, muſt be capable of changes anſwerable thereto. The different apertures of the lips of the glottis, it is proved, produce all the different tones in the ſeveral parts of muſic, and the manner is thus. The voice, it is ſhewn, can only be formed by the glottis, but the tones of the voice are modifications of the voice, and theſe can only be produced by the modifications of the glottis. Now the glottis is capable only of one modification, which is the mutual approach or receſs of its lips; it is this, therefore, produces the different tones. Now that modification includes two circumſtances; the firſt and principal is, that the lips are ſtretched more and more from the loweſt tone to the higheſt: the ſecond is, that the more they are ſtretched, the nearer they approach. From the firſt, it follows, that their vibrations will be ſo much the quicker, as they come neareſt their higheſt tone; and that the voice

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will be juſt, when the two lips are equally ſtretched; and falſe, when unequally; which agrees perfectly well with the nature of ſtring inſtruments. From the ſecond, it follows, that the higher the tones are, the nearer will they approach to each other, which agrees perfectly well with inſtruments governed by reeds or plugs.

The degrees of tenſion of the lips, are the firſt and principal cauſe of tones, but their differences are inſenſible; the degrees of approach are only conſequences of that tenſion, but their differences are more eaſily aſſigned. They are different apertures that produce, or at leaſt that accompany, different tones, both in natural wind-inſtruments, and artificial ones; and the diminution of the aperture, raiſes the tones both of the glottis, and the reed.

VOICE, in grammar, a circumſtance in verbs, whereby they come to be conſidered as either active or paſſive, *i. e.* either expreſſing an action impreſſed on another ſubject, as, *I beat*, or receiving it from another, as, *I am beaten*. See the articles ACTIVE and PASSIVE.

The Greeks have a third voice, called the medial voice, thus denominated, becauſe it has ſometimes an active and ſometimes a paſſive ſignification; though generally it is of an active ſignification. With regard to the termination of this medial voice, it is to be obſerved, that the preſent and imperfect tenſes are the ſame with thoſe of the paſſive voice; or, in other words, when theſe tenſes of the paſſive voice are taken actively, they are then denominated of the medial voice.

VOICE, in matters of election, denotes a vote or ſuffrage. See the article VOTE. In this ſenſe a man is ſaid to have a deliberative voice, when he has a right to give his advice and opinion in a matter of debate, and his ſuffrage is taken. An active voice, when he gives his vote for the election of any one; and a paſſive voice, when the ſuffrages may fall on himſelf to be elected. An excitative voice, when he may act to procure another to be elected. A conſultative voice, when he can only offer reaſons and remonſtrances, whereon the chief or head determines at his own diſcretion.

VOID SPACE, in phyſics. See the article VACUUM, *&c.*

VOID and VOIDABLE, are terms frequently uſed in our law; as a thing that is done contrary to law at the time of the doing, it is ſaid to be void, and no perſon ſhall be bound thereby. But where a thing is only voidable, and not void, though it be what the perſon that did it ought not to have done, yet when it is done, the doer cannot avoid the ſame, notwithſtanding by ſome act in law it may be void in his heir, *&c.* It has been held that the bond of an infant, or one non compos mentis, is void, becauſe the law has not appointed the doing any thing to avoid ſuch bonds. A leaſe for term of life, which is voidable, muſt be made void by re-entry, *&c.* and a deed is generally avoided by ſpecial pleading.

VOIDANCE, or VACANCY, in the canon law, a want of an incumbent upon a benefice, *&c.* See the articles AVOIDANCE and VACANCY.

VOIDED, in heraldry, is underſtood of an ordinary whoſe inner or middle part is cut out, leaving nothing but its edges to ſhew its form, ſo that the field appears through it. Hence it is needleſs to expreſs the colour or metal of the voided part, becauſe it muſt of courſe be that of the field. The croſs voided, differs from the croſs fimbriated, in that the latter does not ſhew the field through it, as the other does; and the ſame obtains in other ordinaries.

VOIDER, in heraldry, one of the ordinaries whoſe figure is much like that of a flaſk or flanch, only that it doth not bend ſo much. See plate CCXCVII. fig. 5.

VOIDING, or EVACUATING, in medicine. See EVACUATION.

VOIR-DIRE, in law, a term uſed where there is a buſy evidence not otherwiſe to be excepted againſt, and it is prayed upon a trial at law that the witneſs may on oath ſpeak the truth, whether he ſhall get or loſe by the matter in controverſy; and in caſe it appears that he is unconcerned and diſintereſted, his teſtimony is allowed, otherwiſe it is not. A witneſs upon a voir-dire, may be examined by the court if he be not a party intereſted in the cauſe, as well as the party for whom he is an evidence, *viz.* the plaintiff or defendant.

VOL, among heralds, ſignifies the two wings of a fowl joined together, borne in armoury, as being the whole that makes the flight. Accordingly, a demi-vol is a ſingle wing.

VOLA, the palm or inſide of the hand, comprehended between the fingers and the wriſt.

VOLANO, or VALONA, a port-town of Italy, in the pope's territory, and dutchy of Ferrara, ſituated on one of the mouths of the Po, on the gulph of Venice, forty miles eaſt of Ferrara.

VOLANT, in heraldry, is when a bird in a coat of arms is drawn flying, or having its wings ſpread out.

VOLATILE, in phyſics, is commonly uſed to denote a mixed body whoſe integral parts are eaſily diſſipated by fire or heat; but it is more properly uſed for bodies whoſe elements or firſt component parts are eaſily ſeparated from each other, and diſperſed in air. For as any mixed body is ſaid to be fixed in a double ſenſe, ſo may it be ſaid to be volatile two ways; whence the ſame body, *e. gr.* mercury, is both volatile and fixed at the ſame time; ſince, as its integral parts, or thoſe which ſtill retain the nature of mercury, are eaſily ſeparable by fire, and readily flies away, it is ſaid to be volatile; and yet as it is very difficult to deſtroy its contexture, and reſolve it by fire, or any other menſtruum, into its firſt elements, it is ſaid to be fixed; the ſame may be ſaid of ſulphur, antimony, *&c.* See FIXED BODIES.

Minerals, for the generality, are leſs volatile than vegetables, and vegetables are leſs ſo than animals. The chemiſts diſtinguiſh greatly between volatile ſalts and fixed ſalts. The capitals of aludels ſtop and collect the volatile parts of ſubſtances in ſublimation, and make what we call flowers. See FLOWERS, SALTS, *&c.*

The particles of fluids which do not cohere very ſtrongly together, ſays Sir Iſaac Newton, and are of ſuch a ſmallneſs as renders them moſt ſuſceptible of thoſe agitations which keep liquors in a fluor, are moſt eaſily ſeparated and rarified into vapour; and, in the language of the chemiſts, they are volatile, rarifying with an eaſy heat, and condenſing with cold. But thoſe which are groſſer, and by that means leſs ſuſceptible of agitation, or cohere by a ſtronger attraction, are not ſeparated without a ſtronger heat, or perhaps not without fermentation; theſe are what the chemiſts call fixed bodies.

When the fire decompounds any mixed body, the parts moſt diſpoſed to receive a great motion are ſooneſt looſened, and riſe up in the order which the differences of that diſpoſition give them, the reſt remaining immoveable at the bottom of the veſſel. Thoſe that riſe firſt, are called volatile parts; ſuch are phlegm, oil, ſpirits and ſalts, both urinous and alkalious. The parts remaining, *viz.* earth and lixivial ſalts, are called fixed. See the articles PHLEGM, OIL, *&c.*

VOLATILISATION, or VOLATILIZATION, the act of rendering fixed bodies volatile, or of reſolving them by fire into a fine ſubtile vapour or ſpirit, which eaſily diſſipates and flies away. All bodies, even the moſt fixed, as gold, may be volatilized; either of themſelves, or with the admixture of ſome volatile ſubſtance, or ſpirit, by diſtillation or ſublimation. See the articles GOLD, DISTILLATION, *&c.*

VOLATILITY. See VOLATILE and SUBLIMATION.

VOLCANO, or VULCANO. See the article VULCANO.

VOLERY, a great bird-cage, ſo large that the birds have room to fly up and down in it.

VOLHINIA, or VOLONIA, a province of Poland, bounded by Poleſia, on the north; by the lower Volhinia, or Ukrain, in the territories of Ruſſia, on the eaſt; by Podolia, on the ſouth; and by the province of Red Ruſſia, on the weſt.

VOLITION, the act of willing. See the article WILLING.

VOLKAMERIA, in botany, a genus of the *didynamia-angioſpermia* claſs of plants, the corolla whereof conſiſts of a ringent, ſingle petal: the tube is cylindric, and twice the length of the cup: the limb is divided into five plane ſegments: the fruit is a roundiſh bilocular capſule; the ſeed is a ſingle bilocular nut.

VOLLEY, a military ſalute, made by diſcharging a great number of fire-arms at the ſame time.

VOLO, in roman antiquity, an appellation given to the ſlaves, who, during the ſecond punic war, offered themſelves to ſerve in the army.

VOLT, or VOLTE, in the manege, a round or circular tread; and hence, by the phraſe, to make volts, is underſtood a gate of two treads, made by a horſe going ſideways round a center, in ſuch a manner, that theſe two treads make parallel tracts, one larger made by the fore feet, and another ſmaller made by the hind feet, the croup approaching towards the center, and the ſhoulders bearing outwards. Sometimes the volt is of one tread; as when a horſe makes volts in corvets, and in caprioles, ſo that the haunches follow the ſhoulders, and move forwards

forwards on the ſame tread. In general, the way and tract of a volt is made ſometimes round, ſometimes oval, and ſometimes ſquare, of four ſtraight lines; ſo that theſe treads, whether round or ſquare, incloſe a terrain, or manege-ground, the middle of which is ſometimes diſtinguiſhed by a pillar, or elſe by an imaginary center, which is there ſuppoſed in order to regulate the diſtances and the juſtneſs of the volt.

A demi-volt is a demi-round of one or two treads, made by the horſe at one of the corners of the volt, or elſe at the end of the line of the paſſade; ſo that being near the end of this line, or one of the corners of the volt, he changes hands, to return by a ſemi-circle.

A renverſed volt, is a tract of two treads, made by the horſe, with his head to the center, and his croup out; ſo that he goes ſide-ways upon a walk, trot, or gallop, and traces out a ſmall circumference with his ſhoulders, and a larger one with his croup.

This different ſituation of the ſhoulders and the croup, with reſpect to the center, gave this volt the name of renverſed, as being oppoſite in ſituation to the former.

VOLTA, a river of Guinea, in Africa, which running from north to ſouth, falls into the ocean eaſt of Acra.

VOLTERRA, a town of Tuſcany, in Italy, twenty-three miles ſouth of Florence.

VOLTURARA, a town of the kingdom of Naples, fifty-five miles north-eaſt of the city of Naples.

VOLTURNO, a river of the kingdom of Naples, which, riſing in the province of Moliſe, runs by Capua, and falls into the gulph of Gaieta.

VOLUBILIS, in botany, a name uſed by Dillenius for a ſpecies of convolvulus. See the article CONVOLVULUS.

VOLUME, *volumen*, in matters of literature, a book, or writing, of a juſt bulk to be bound by itſelf. The name is derived from the Latin *volvere*, to roll up; the antient manner of making up books being in rolls of bark or parchment. See the articles BOOK, TOME, *&c.*

Foreign philoſophers uſe the phraſe, volume of a body, for its bulk, or the ſpace incloſed within its ſuperficies. See the articles BODY, SOLID, *&c.*

VOLUMUS, in law, the firſt word of a clauſe in one ſpecies of the king's writs of protection and letters-patent.

VOLUNT, *voluntas*, in law, is when a tenant holds lands, *&c.* at the will of the leſſor, or lord of the manor. See the article TENURE.

VOLUNTARY, in muſic, a piece played by a muſician extempore, according to his fancy. This is often uſed before he begins to ſet himſelf to play any particular compoſition, to try the inſtrument, and to lead him into the key of the piece he intends to perform.

VOLUTA, in natural hiſtory, a genus of univalve ſhells, with an oblong mouth, a clavicle ſometimes erect and ſometimes depreſſed, and ſometimes coronated at top. To this genus belong the admiral-ſhells, tiger-ſhells, *&c.* See ADMIRAL and TIGER.

VOLUTE, *voluta*, in architecture, a kind of ſpiral ſcroll, uſed in the ionic and compoſite capitals, whereof it makes the principal characteriſtic and ornament. See IONIC and COMPOSITE.

There are ſeveral diverſities practiſed in the volute. In ſome, the liſt or edge, throughout all the circumvolutions, is in the ſame line or plane; ſuch are the antique ionic volutes, and thoſe of Vignola. In others, the ſpires or circumvolutions fall back; in others, project, and ſtand out. Again, in ſome, the circumvolutions are oval, in others, the canal of one circumvolution is detached from the liſt of another by a vacuity or aperture. In others, the rind is parallel to the abacus, and ſprings out from behind the flower thereof. In others, it ſeems to ſpring out of the vaſe from behind the ovum, and riſes to the abacus, as in moſt of the fine compoſite capitals.

VOLVULUS, in medicine, a name which ſome authors give to the iliac paſſion, by others called chordapſus, and by others miſerere mei. See ILIAC.

VOMER, in anatomy, a bone of the upper-jaw, ſituated between the bones of the palate and the ſphenoidal bone, being alſo joined to the proceſs of the ethmoides, and part of the lower jaw, and having its fore-part, which is ſpongy, continued to the middle cartilage of the noſe, and making, in conjunction with it, the ſeptum nari. See NOSE and MAXILLA.

VOMICA, in medicine, is commonly taken for a ſuppurated impoſthume, or an abſceſs with a ſuppuration. See ABSCESS, *&c.* The vomica pulmonum is a latent diſeaſe of the lungs, which often deceives under a ſhew of health. What goes by this name, is a ſmall abſceſs ſeated in ſome part of the lungs, and ſtraitly in-

cloſed within a bag or membrane. This diſorder is moſt incident to thoſe who are afflicted with a tabes, or labour under an anaſtomoſis or ruptuie of a vein in the lungs. In this diſeaſe, the breath ſmells ill long before the vomica breaks; ſometimes blood comes up with coughing, the body is perfectly dull and heavy, and the cough very long and troubleſome, and ſometimes followed by an expectoration of the vomica, in which caſe the patient is ſeized with no ſmall fever, ſucceeded by bloody ſpit, and a vaſt perturbation of body; the conſequence of which circumſtance may poſſibly be a recovery to a good ſtate of health. It has often happened that the vomica, by a ſudden rupture, has diſcharged itſelf into the heart, and occaſioned ſudden and unexpected death. See PHTHISIS.

Nux VOMICA, in pharmacy, a flat, compreſſed round fruit, of the breadth of a ſhilling, or ſomewhat more, and of about the thickneſs of a crown-piece. Its ſurface is not much wrinkled or corrugated, but ſometimes marked with tolerably regular fibres, running from the center to the circumference; it is ſomewhat downy or woolly, and of an extreme firm texture, tough like horn, and of a pale greyiſh-brown colour. It has a ſort of umbilicus on each ſide of the center, and is more prominent on one ſide, and more depreſſed on the other; it is very difficultly cut or broken, and leaves a ſmooth and gloſſy ſurface behind the knife; it is moderately heavy, and is of a ſomewhat paler colour within than on the ſurface; it has no ſmell, but an extremely bitter taſte. We have it only from the Eaſt-Indies, whence it is brought with another drug called the lignum colubrinum. It was held by many to be the root of a plant, and by others to be a fungus or an excrement. But it is in reality the nucleus of a fruit of an Eaſt-Indian tree, the wood of which is the lignum colubrinum of the ſhops. See COLUBRINUM.

Some have preſcribed ſmall doſes of the nux vomica as a ſpecific againſt a gonorrhœa, and others againſt quartan agues. But we have ſo many good and ſafe medicines for all theſe purpoſes, that there ſeems no occaſion for our having recourſe to ſuch as theſe, which ſhew ſo many ſigns of miſchief.

There is another ſpecies of the nux vomica, deſcribed by Breynius, under the name of modira caniram, and nux vomica officinarum vera. Commelin determines this tree, not the former, to afford the true nux vomica, and the true lignum colubrinum of the ſhops; and Herman, on the other hand, is as poſitive as to the other. There is alſo another ſort of nux vomica, which is much ſmaller than the former, very like them, and has all their qualities: it is the fruit of another ſpecies of the ſame genus, which is the tree that furniſhes the true officinal wood.

VOMIT, or EMETIC, in pharmacy. See the article EMETIC.

VOMITING, in medicine, a retrograde ſpaſmodic motion of the muſcular fibres of the oeſophagus, ſtomach, and inteſtines, attended with ſtrong convulſions of the muſcles of the abdomen and diaphragm, which, when gentle, create a nauſea; when violent, a vomiting. Theſe convulſive diſorders proceed from the immoderate quantity, or acrimony of the food; from poiſons; from ſome injury of the brain, as a wound, contuſion, compreſſion, or inflammation of that part; from an inflammation of the diaphragm, ſtomach, inteſtines, ſpleen, liver, kidneys, pancreas, or meſentery; from an irritation of the gula; from a diſorderly motion of the ſpirits, by unaccuſtomed agitations in a coach, ſhip, or otherwiſe, or from the idea of ſomething nauſeous.

The two principal curative indications to be obſerved are, firſt, to quiet and compoſe the convulſive and unruly motion of the ſtomach; and, ſecondly, to oppoſe and ſubdue the material cauſes of the diſorder.

The firſt intention is anſwered by corroborating and antiſpaſmodic medicines, ſuch as ſaffron and caſtor, with the teſtaceous powders, as coral, crabs-claws, and oyſter ſhells; powders compoſed of cinnamon, the leaves of mint, nutmeg, orange-peel, calamus aromaticus, and other ſuch ſimples, are alſo of great ſervice. And if anodynes are found neceſſary, the ſtorax pill, or Sydenham's laudanum, are to be given.

While theſe medicines are taken internally, there may alſo be applied outwardly, to the region of the ſtomach, ſuch things as have power to repreſs its diſorderly motions; of this kind are the oil of mint, nutmeg, and the like, with balſam of Peru: theſe oils may be reduced to a proper conſiſtence, with this balſam, for the ſpreading on leather, and laying on for ſome time. Hungary-water, and other the like ſpirits, are of great uſe alſo, rubbed on with the hand; and to theſe

may be added yeaſt, and the ſtrongeſt wine-vinegar applied hot to the part. Finally, an excellent application is balſam of Peru alone, reduced to the conſiſtence of a cataplaſm, with crumb of bread. The methods to be uſed to remove the material cauſes of the vomiting, are next to be conſidered: if it be of the pituitous kind, and owing to crudities in the primæ viæ, and a viſcid mucus ſticking to them, it is beſt cured by an emetic: if the vomiting of itſelf be found not ſufficient to carry off the ſordes which occaſion it, and the patient continues, after the fits of vomiting, afflicted with a nauſea and heart-burn; in this caſe, a large quantity of warm water, with a little butter, may ſerve the purpoſe; or if this be found inſufficient, a doſe of ipecacuanha is to be given.

VOORN, one of the iſlands of Holland, bounded by the river Maes, which divides it from the continent and the iſland of Iſſelmunde, on the north; by the ſea called the Bies-boſch, on the eaſt; by another branch of the Maes which divides it from the iſlands of Goree and Overflackee, on the ſouth; and by the German-ſea on the weſt; being about twenty-four miles long, and five broad.

VOPISCUS, a latin term uſed, in reſpect of twins in the womb, for that which comes to the perfect birth; the other being before excluded abortive.

VORTEX, in meteorology, a whirlwind, or ſudden, rapid, and violent motion of the air in gyres, or circles.

Vortex is alſo uſed for an eddy or whirlpool; or a body of water, in certain ſeas or rivers, which runs rapidly around, forming a ſort of cavity in the middle.

VORTEX, in the carteſian philoſophy, is a ſyſtem or collection of particles of matter moving the ſame way, and round the ſame axis. See CARTESIAN.

Such vortices are the grand machines, whereby thoſe philoſophers ſolve moſt of the motions and other phænomena of the heavenly bodies. Accordingly, the doctrine of theſe vortices makes a great part of the carteſian philoſophy.

But this doctrine of vortices is at beſt merely hypothetical. It does not pretend to ſhew by what laws and means the celeſtial motions are really effected, ſo much as by what means they poſſibly might, in caſe it ſhould have ſo pleaſed the Creator. But we have another principle which accounts for the ſame phænomena, as well, nay, better, than that of vortices; and which we plainly find has an actual exiſtence in the nature of things; and this is gravity, or the weight of bodies. See GRAVITATION, GRAVITY, &c.

The vortices then ſhould be caſt out of philoſophy, were it only that two different adequate cauſes of the ſame phænomena are inconſiſtent. See *Newtonian* PHILOSOPHY.

But we have other objections againſt it. For, 1. If the bodies of the planets and comets be carried round the ſun in vortices, the bodies of the parts of the vortex immediately inveſting them, muſt move with the ſame velocity, and in the ſame direction; and beſides, muſt have the ſame denſity, or the ſame vis inertiæ. But it is evident that the planets and comets move in the very ſame parts of the heavens, with different velocity and in different directions. It follows, therefore, that theſe parts of the vortex muſt revolve at the ſame time in different directions, and with different velocities; ſince one velocity and direction will be required for the paſſage of the planets, and another for that of comets. 2. If it were granted that ſeveral vortices were contained in the ſame ſpace, do penetrate each other, and revolve with divers motions; ſince thoſe motions muſt be conformable to thoſe of the bodies which are perfectly regular, and performed in conic ſections; it may be aſked, how they ſhould have been preſerved entire ſo many ages, and not diſturbed nor confounded by the adverſe actions and ſhocks of ſo much matter as they meet withal? 3. The number of comets is very great, and their motions perfectly regular, obſerving the ſame laws with the planets, and moving in conical orbits which are exceedingly excentric. Accordingly they move every way, and to all parts of the heavens, freely pervading the planetary regions, and going frequently contrary to the order of the ſigns; which would be impoſſible, unleſs theſe vortices were away. See COMET. 4. If the planets move round the ſun in vortices, thoſe parts of vortices next the planets, we have already obſerved, would be equally denſe with the planets themſelves, conſequently, the vortical matter, contiguous to the perimeter of the earth's orbit, would be as denſe as the earth itſelf; and that between the orbits of the earth and ſaturn, it muſt be as denſe or denſer. For a vortex cannot maintain itſelf, unleſs the more denſe parts be in the center, and the leſs denſe

towards

towards the circumference; and, ſince the periodical times of the planets are in a ſeſquialterate ratio of their diſtances from the ſun, the parts of the vortex muſt be in the ſame ratio. Whence it follows, that the centrifugal force of the parts will be reciprocally as the ſquares of the diſtances. Such, therefore, as are at a greater diſtance from the center, will endeavour to recede therefrom with the leſs force. Accordingly, if they be leſs denſe, they muſt give way to the greater force, whereby the parts nearer the center endeavour to riſe. Thus the more denſe will riſe, and the leſs denſe deſcend; and thus there will be a change of places, till the whole fluid matter of the vortex be ſo adjuſted, as it may reſt in æquilibrio. See PLANET, *&c.*

Thus will the greateſt part of the vortex, without the earth's orbit, have a degree of denſity and inactivity, not leſs than that of the earth itſelf. Whence the comets muſt meet with a very great reſiſtance, contrary to all appearances. See RESISTANCE.

VOTE, the ſuffrage or reſolve of each of the members of an aſſembly, where any affair is to be carried by a majority; but more particularly uſed for the reſolves of the members of either houſe of parliament. See PARLIAMENT.

VOTIVE MEDALS, thoſe on which are expreſſed the vows of the people for the emperors or empreſſes. See MEDAL.

VOUCHER, in law, is a perſon called into court, to make good another's warranty, who is either to defend the right againſt the demandant, or yield him other lands to the value, *&c.* See WARRANTY.

This extends to lands or tenements of freehold or inheritance, but not to any thing perſonal or mixed.

Here he that voucheth is called the voucher, and the perſon that is vouched is called the vouchee. There is alſo a foreign voucher when the tenant impleaded in a particular juriſdiction, voucheth one to warranty in ſome other county, out of the juriſdiction of that court, and prays that he may be ſummoned.

VOUCHER alſo ſignifies a receipt or acquittance in caſes of account.

VOUTENAI, a town of France, in the dutchy of Burgundy, twenty miles ſouth-eaſt of Auxerre.

VOW, a ſolemn and religious promiſe, or oath. See OATH.

The uſe of vows is found in moſt religions. They make up a conſiderable part of the pagan worſhip, being made either in conſequence of ſome deliverance, under ſome preſſing neceſſity, or for the ſucceſs of ſome enterprize. Among the Jews, all vows were to be voluntary, and made by perſons wholly in their own power; and if ſuch perſon made a vow, in any thing lawful and poſſible, he was obliged to fulfil it. If he appointed no particular time for accompliſhing his vow, he was bound to do it inſtantly, leſt by delay he ſhould prove leſs able, or be unwilling, to execute his promiſe. Among the romaniſts, a perſon is conſtituted a religious by taking three vows, that of poverty, chaſtity, and obedience.

VOWS, *vota*, among the Romans, ſignified ſacrifices, offerings, preſents and prayers made for the Cæſars and emperors, particularly for their proſperity and the continuance of their empire. Theſe were at firſt made every five years, then every fifteen, and afterwards every twenty, and were called quinquennalia, decennalia, and vincennalia.

VOWEL, *vocalis*, in grammar, a letter which affords a complete ſound of itſelf, or a letter ſo ſimple as only to need a bare opening of the mouth to make it heard, and to form a diſtinct voice. See the article LETTER.

The vowels are ſix in number, *viz.* A, E, I, O, U. Y, and are called vowels in contradiſtinction to certain other letters, which, depending on a particular application of ſome part of the mouth, as the teeth, lips or palate, can make no perfect ſound without an opening of the mouth, that is, without the addition of a vowel, and are therefore called conſonants. See the article CONSONANT.

Grammarians reckon alſo eight ſemi-vowels, *viz.* F, H, L, M, N, R, S, Z, ſo denominated becauſe they approach nearer a vowel in the pronunciation. Of theſe ſemi-vowels four, *viz.* L, M, N, R, are called liquid. See LIQUID.

VOX, or VOCEM NON HABERE, in law, a phraſe uſed by Bracton to ſignify an infamous perſon.

UPHOLSTER, UPHOLSTERER, or UPHOLDER, a tradeſman that makes beds, and all ſorts of furniture thereunto belonging, *&c.*

Upholſters, in carrying on their trade, are to ſtuff their beds with one ſort of dry pulled feathers, and not mix any other therewith, on pain of forfeiting the ſame, or the value; and their ſtuffing for quilts is to be clean wool, or flocks, without uſing

uſing any horſe hair, &c. therein, under the like pain. See BED, &c.

UPLAND, denotes high ground, or, as ſome call it, terra firma, by which it ſtands oppoſed to ſuch as is mooriſh, marſhy, or low.

The uplands lie either on the tops of hills, or on their ſides, or on the ſlopes of riſing grounds. They ſometimes have a ſandy ſoil, ſometimes a rocky, gravelly, or loamy one; and ſometimes they conſiſt of a tough clay, or a black mould; they are uſed by the farmers, either for grazing or corn, as they happen to be more moiſt or more dry; and this difference depends upon their ſituation and nature. Theſe lands which lie flat upon the tops of hills, are uſually the drieſt, and thoſe which form the ſlopes or ſides, are generally the moiſteſt, becauſe of the wet that is continually oozing through them. The upland meadows have ſome diſadvantage, as they often need mending or feeding, which thoſe that lie lower do not; but then they make amends for this in their hay, which is always much finer and ſweeter that that of the low lands.

UPLAND, a province of Sweden, bounded by the province of Geſtricia on the north-weſt, by the Baltic-ſea on the north eaſt and ſouth-eaſt, and by Sunderland and Weſtmania on the ſouth and weſt.

UPPINGHAM, a market town of England, in the county of Rutland, ſituſated ſix miles ſouth of Okeham.

UPRIGHT, in architecture, a repreſentation or draught of the front of a building, called alſo an elevation or orthography. See ELEVATION, &c.

UPRIGHT, in heraldry, is uſed in reſpect of ſhell fiſhes, as crevices, &c. when ſtanding erect in a coat. Inaſmuch as they want fins, they cannot, according to Guillim, be properly ſaid to be hauriant, that being a term appropriated to ſcaly fiſhes.

UPSAL, a city once the capital of the province of Upland, and of all Sweden, being the only archbiſhop's ſee in Scandinavia, and an univerſity, ſituated in eaſt long. 17° 30', north lat. 60°.

UPTON, a market-town of Worceſterſhire, nine miles ſouth of Worceſter.

UPUPA, the HOOPOE, in ornithology, a genus of birds with the beak arcuated, convex, compreſſed and equal, and having a furrow running along each ſide of it; there is a creſt on the head, which is capable of folding back. This is an extremely ſingular bird, but it is ſo thick covered with feathers, that it appears large in proportion to its weight; the head is large, and ornamented with an elegant creſt; the eyes are ſmall, but very bright and piercing; the tail is between four and five fingers breadth long, in the middle whereof there is an elegant ſpot of white, of the figure of a new moon; the back is variegated with black and white in an elegant manner; the legs are ſhort, and the outer toe is connected to the middle one ſome part of the way down, without the help of a membrane.

URACHUS, in anatomy, a membranous canal in the fœtus of quadrupeds in general, of a pyramidal figure, extended immediately from the fundus of the bladder to the navel, and after paſſing through this, it is by degrees enlarged, and makes its way into the allantois at right-angles each way, or nearly ſo, and conveys the urine from the bladder into the cavity of this membrane. In the human fœtus, the whole urachus is not pervious, or very rarely ſo; it is uſually found ſolid, in form of a ligament. It ſcarce appears probable, therefore, that it ſerves the office of diſcharging the urine from the bladder in this as in the former caſe, and eſpecially as there is no ſuch membrane as the allantois in the human body, nor any cavity formed for the reception of ſo great a quantity of fluid. See the articles FOETUS, ALLANTOIS, &c.

URANBURG, or URANIBURG, a caſtle of Denmark, ſituated on the little iſland of Huen, in the Sound, ſixteen miles north eaſt of Copenhagen. Here was the celebrated obſervatory built by that noble Dane Tycho Brahe, and furniſhed with inſtruments for obſerving the courſe and motions of the heavenly bodies.

URANOSCOPUS, the STAR-GAZER, in ichthyology, a ſpecies of trachinus, with numerous cirri on the under jaw. See the article TRACHINUS.

This fiſh is of an extremely ſingular figure; the body is rounded, a little depreſſed; the back broad, the ſides prominent, and the belly ſomewhat flatted; the head is large and depreſſed; the mouth divided, as it were, into three ſpines under the tongue, and the lower jaw turning upwards; the eyes are large and ſtand near one another, not on the ſides, but on the top of the head; ſo that the fiſh naturally looks ſtraight upward; the iris is of a gold-yellow, the pupil is of a bluiſh-black, the noſtrils have each a double aperture, and are placed at ſome diſtance under the eyes; the whole head, and the

coverings

coverings of the gills, are beſet with a great number of rough and ſharp tubercles; there are two back fins, the firſt has three prickly rays, the ſecond has fourteen; the pectoral fins have each ſixteen rays, the ventral ones have each five, and the pinna ani has thirteen. See plate CCXCVI. fig. 6.

URBINO, a province of Italy, in the pope's territory, bounded by Romania and the gulph of Venice on the north and eaſt, by the marquiſate of Ancona on the ſouth, and by Tuſcany on the weſt, being ſeventy miles long, and from twenty to fifty broad.

Urbino is alſo the capital of this province.

URDE', or URDE'E, in heraldry. A croſs urdé ſeems to be the ſame with what we otherwiſe call cleche, or chlechée. See CHLECHE.

UREDO, the blaſting or blighting of trees or herbs. See BLIGHTING.

It is ſometimes uſed by phyſicians for an itching or burning of the ſkin.

URENA, in botany, a genus of the *monadelphia-polyandria* claſs of plants, the corolla whereof conſiſts of five oblong, obtuſe, connated petals, broader than the apex, and narrower at the baſe; the fruit is a round echinated capſule, with five angles, conſiſting of five cells, and made up of five valves; the ſeeds are ſolitary, roundiſh, and compreſſed.

URETERS, *ουρητηρες*, in anatomy, two membranaceous tubes or pipes, nearly cylindric in figure, and of about the thickneſs of a quill: but their diameter is very uncertain. They ariſe from the kidney, one from each, and terminate in the urinary bladder. See KIDNEY.

At their origin in the kidneys they are expanded into the form of a funnel, and this expanſion makes the pelvis of the kidneys. See the article PELVIS.

At their termination, which is in the hinder and lower part of the bladder, they paſs obliquely in between its membranes, and open into the bladder by very narrow orifices, and can admit nothing into them from the bladder. They are not ſtraight, but ſomewhat bent, ſo as to reſemble the letter *S*; their ſubſtance is membranaceous, and they are compoſed of three coats: the firſt a common one, from the peritonæum; the ſecond, a thin muſcular one; and the third a nervous one, covered with a lubricous humour; and in this there are ſometimes diſcovered glands. The blood-veſſels and nerves come from the adjacent parts.

The uſe of the ureters is to receive the urine ſecreted in the kidneys from the pelvis, and to carry it to the urinary bladder. When theſe are obſtructed, a ſuppreſſion of urine is the conſequence; for there is no other way for the urine to get into the bladder but through them. They are often found of an unnatural ſize, owing to ſtones concreted from among the urine. See BLADDER, URINE, DYSURY, &c.

URETHRA, *ουρηθρα*, in anatomy, a membranaceous tube or canal, of a cylindric figure, ariſing from the neck of the bladder, and continued to the pudendum, ſerving to diſcharge or carry off the urine and ſemen.

The length of the urethra is very different in both ſexes. In man it is twelve or thirteen inches, from the neck of the bladder to the extremity of the glans. It is ſituated in a kind of narrow furrow, formed between the corpora cavernoſa, in the bottom or lower part of the penis. It does not run perfectly ſtraight, but is bent in a very ſingular manner. Its cavity is as large as that of a gooſe-quill. It is compoſed of two robuſt membranes, an exterior and interior; their ſubſtance is thin and tough, and between them there is a ſpongeous or cavernous matter, in which ſome authors pretend to have diſcovered glands, but this is uncertain. The bulb of the urethra is that part of it next to the proſtatæ; it is much thicker than the reſt of the tube, and is about an inch long, and in ſome meaſure reſembles a walnut. It is of a thick and ſpongy texture. The interior ſurface of the urethra, is full of roundiſh and oblong foraminulæ and furrows, out of which there may often be preſſed a thick viſcuous fluid, the uſe of which is to lubricate the urethra, and to defend it from the acrimony of the urine. See the articles PENIS, GLANS, &c.

The urethra or urinary paſſage in women, uſually called meatus urinarius, is ſituated ſtraight under the clitoris, and ſhews itſelf by a little eminence. Its length is about two fingers breadth; its diameter is greater than that in man, but ſomewhat narrower at the end than elſewhere. It is capable of great dilatation. There are in it certain little ducts, which convey to its inner ſurface a mucous humour, for lubricating and defending it from the acrimony of the urine, like thoſe in man; but their origin is uncertain.

URGEL,

URGEL, a town of Spain, in the province of Catalonia, capital of the territory of Urgel, ſituated on the river Segra, ſeventy-five miles north of Barcelona.

URI, one of the cantons of Switzerland; bounded by that of Switz, on the north; by Glaris and the Griſons, on the eaſt; by Underwald, on the ſouth; and by the Canton of Bern, on the weſt.

URIM and THUMMIM, among the antient Hebrews, a certain oracular manner of conſulting God, which was done by the high-prieſt dreſſed in his robes, and having on his pectoral, or breaſt-plate. Various have been the ſentiments of commentators concerning the urim and thummim. Joſephus, and ſeveral others, maintain that it meant the precious ſtones ſet in the high-prieſt's breaſt-plate, which by ſome extraordinary luſtre made known the will of God to thoſe who conſulted him. Spencer believes that the urim and thummim were two little golden figures ſhut up in the pectoral as in a purſe, which gave reſponſes with an articulate voice. In ſhort, there are as many opinions concerning the urim and thummim as there are particular authors that wrote about them. The ſafeſt opinion, according to Broughton, ſeems to be, that the words urim and thummim ſignify ſome divine virtue and power annexed to the breaſt-plate of the high-prieſt, by which an oraculous anſwer was obtained from God when he was conſulted by the high-prieſt; and that this was called urim and thummim to expreſs the clearneſs and perfection which theſe oracular anſwers always carried with them; for urim ſignifies light, and thummim perfection; theſe anſwers not being imperfect and ambiguous, like the heathen oracles, but clear and evident. The uſe made of the urim and thummim was to conſult God in difficult caſes relating to the whole ſtate of Iſrael; and ſometimes in caſes relating to the king, the ſanhedrim, the general of the army, or ſome other great perſonage.

URINAL, in medicine, a veſſel fit to receive and hold urine, and uſed accordingly for the convenience of ſick perſons. It is uſually of glaſs and crooked; and ſometimes it is filled with milk to aſſwage the pain of the gravel. See the articles URINE, STONE, and UROCRITERIUM.

URINAL, in chemiſtry, is an oblong, glaſs-veſſel, cloſed for making ſolutions, and ſo called from its reſemblance to the glaſſes in which urine is ſet to ſettle for the inſpection of the phyſician.

URINARIA FISTULA, or URINARY PASSAGE, the ſame with urethra. See the article URETHRA.

URINE, *urina*, a ſerous and ſaline fluid, of a citron-colour, ſeparated from the blood, and carried by the emulgent arteries to the kidneys, from whence it deſcends to the bladder by the ureters, and is, from time to time, emitted thence by the canal of the urethra. See BLOOD, ARTERY, *&c.*

The urine is therefore the ſerofity of the blood, but not pure, for it is loaded with ſaline, ſulphureous, and terreſtrial particles, of which it is the menſtruum and the vehicle. The ſides of the bladder are guarded by a mucilaginous fluid, excreted by the glands which are between its coats, by which means the urinous ſalts make the leſs impreſſion upon it. This fluid forms the glair which falls to the bottom of the veſſel when a perſon is afflicted with the ſtone. It is obſervable, that there are three ſorts of ſubſtances differently placed in the urine, *viz.* the nubecula, the encœorema, and the hypoſtaſis. The nubecula is a ſort of a pellicle which ſwims on the top of the urine, and conſiſts of the ſaline and fibrous particles of the blood mixed with the ſeroſity. When it is expoſed to the fire it changes to a cruſtaceous ſubſtance. The enæorema, or ſuſpenſion, is a white, light, ſpongious matter which ſwims in the middle of the urine, conſiſting of particles of a different nature. The hypoſtaſis, or ſediment, is a ſaline, ſulphureous, and terreſtrial matter, which precipitates to the bottom of the urine. See NUBECULA, *&c.*

The urine of four-footed beaſts is troubled and muddy, that of men is more clear and limpid. In infants it is more pale and thick than that of middle-aged perſons. In the very old it is more clear, thin, and has not ſo much colour. In hot, bilious conſtitutions, it is more of a ſaffron colour: in the cold and pituitous, pale. Wine drinkers have it of a higher colour, and more thick: in thoſe that uſe much exerciſe it is little and red: in the idle it is pale with a large ſediment. After meals it is copious, inſipid, light, raw, and without ſmell: and after long faſting, it is of a higher colour, acrid, and little. Thoſe that ſweat much make little water, which is more muddy and yellow. Diſeaſes cauſe a remarkable change in

urine. Light, thin, watry urine, ſhews the perſon to be afflicted with internal ſpaſms, the hyſteric paſſion, the hypochondriac pains, the cradialgia, the ſtone or gravel, or convulſive colic. In diſeaſes of the head, ſuch as the vertigo, phrenſy, madneſs, melancholy, and epilepſy, the urine is always thin and light. It is likewiſe the ſame in the more grievous afflictions of the nerves from poiſon or worms. This ſtate of the urine not only happens in the fits, but ſome days before and after. See SPASM, HYSTERIC *paſſion, &c.*

When the urine is thin, aqueous, and always white, it preſages danger in obſtinate diſeaſes if it is copious in the ſtate of fevers, and before the criſis, it portends a phrenſy. In internal inflammations it is always dangerous, the more copious the worſe. After a dyſentery, a ſpotted fever, or the ſmall pox, this kind of urine is common. In a cachexy, leucophlegmatia, enormous bleedings in the beginning of an anaſarca, in the green-ſickneſs, in a ſuppreſſion of the menſes, the urine is crude, turbid, pale, greeniſh, or of a light citron-colour, and copious. In all preternatural febrile heats, the urine is yellow or red, and in ſmall quantities: ſuch kind of urine as is more or leſs red, or thin and light, or thick and heavy, is uſually in intermitting and continual fevers. In the fit, that is, in its exerbation or ſtate, the urine is thin, clear, and without ſediment. In an ardent and bilious fever, the urine is generally pellucid, but of a flame-colour. In intermittents after the fit, and on the well day, it is thick, and depoſits a ſediment. If this happens in continual fevers after the criſis, it ſhews the fever to be ended. If the ſediment is of a roſy or purple-colour, it ſhews the blood is in fault, as is evident in continual fevers. When it is intenſely yellow, it diſcovers that the bile is in fault. When it is brown or black, there is plenty of black bile, as in a ſcorbutic or miliary fever, and in quartans of a dangerous nature. When it is very plentiful, and full of viſcid and crude humours, in replete, obeſe, and ſpongy bodies, it ſhews the obſtinacy of an intermitting fever. See DISEASE, FEVER, *&c.*

As it is a good ſign when the urine is thick and depoſites a ſediment, in fevers; ſo, on the contrary, if there is no ſediment in intermitting fevers, but the urine continues clear, and lets fall no ſediment in the cold fit, it is a very bad ſign. If, after the fit, it has no ſediment, but is pellucid, it is a very bad omen. In all inflammatory fevers, if the urine is clear and of a purple colour, or brown, and of a deep colour, frothy and without ſediment, it is a bad ſign. Likewiſe, it is always obſerved, that in a continual fever, if the urine is turbid, and does not grow clear either by the fire or reſt, nor depoſits a ſediment, it is a very dangerous preſage; it is likewiſe very bad, when in continual fevers, it is thick on the firſt days, and in the remainder, eſpecially the critical days, it is thin and without ſediment. In the decline of catarrhal fevers, and in the ſmall-pox and meaſles, if the urine was clear and aqueous, but is now thick and high-coloured, with a ſediment, it is a certain ſign that the diſeaſe remits. See the article INTERMITTING *Fevers.*

In conſumptions, and all other violent and chronical diſeaſes, if the urine is thick, high-coloured, and a dark red, with a copious ſediment, and a fatneſs ſwims upon the urine, and adheres to the ſides of the urinal, the body at the ſame time waſting away, it is a ſign of a ſlow hectic fever, which is generally fatal. The like danger is threatened when in dropſical perſons the urine is like that of hectics, for its ſcarcity is a ſign that the lympha is extravaſated into ſome cavity or porous ſubſtance; and if the colour is of a deep red, with a groſs ſediment, it ſhews the inteſtine motion and heat diſſolves the blood, that the liver is obſtructed; whence a bilious ſordes is ſeparated therefrom. See the article CONSUMPTION, *&c.*

In chronical diſeaſes, without a fever, when the urine is thick, high-coloured, and of a reddiſh-brown, as well as heavy, as in the confirmed ſcurvy, gout, ſcorbutic palſy, and in extreme old age, as alſo in a nephritic paſſion, when the pains ceaſe, as well as in the yellow and black jaundice, it ſhews a plenty of ſaline and ſulphureous excrementitious parts, wherewith the blood and humours abound, and are not duly ſecreted therefrom, by reaſon of an obſtruction of the liver. Willis has obſerved, that patients dying of the ſcurvy have had their livers almoſt without blood, and like a cow's udder. In ſome the gall-bladder was either empty or full of ſtones, or very bitter filth.

When the urine is thick, of a deep colour, and dyes linnen yellow, it is a

ſign that the bile is obſtructed, or the duct conſtricted with a ſpaſm, whence the paſſage of the bile into the duodenum is hindered; whence it regurgitates by the lymphatic veſſels into the blood and lympha, and produces a jaundice. When the colour is of a browniſh black, it is a ſign of the black jaundice, which proceeds from an impeded ſecretion of the bile in the liver. See JAUNDICE.

Sometimes the urine is imbuted with an oily matter, and is made without noiſe, there are various colours on the ſurface, chiefly bluiſh, and it adheres ſo ſtrongly to the ſides of the urinal, that it cannot be waſhed off with a lixivious liquor. This is a ſign of the colliquation of the fat: it ſhews a conſumption, an atrophy, and an hectic. Sometimes it is obſervable in fevers, and the oleous matter is more plentiful in proportion to the fatneſs of the body. See ATROPHY, *&c.*

When the urine abounds too much with a tartarious matter, which is known by its adhering to the ſides of the chamber-pot, it is a ſign of a diſpoſition to the gravel and ſtone. When there is a ſmall ſand in the urine, it ſhews thoſe diſorders to be actually preſent. Sometimes ſhining yellow cryſtals are ſeen on the ſides of the pot, which is a ſign of arthritic or rheumatic pains. When the urine is bloody or whitiſh, from a mixture of pus loaded with a glutinous, thick, tenacious matter, of a bad ſmell, which ſinks to the bottom, and does not diſſolve by the agitation of the veſſel, it is a certain ſign of an ulcer in the kidneys or bladder. Sometimes, in the ſtone and ulcer of the bladder, it is like the white of an egg, and ſo tenacious that it will not divide, but fall from the veſſel at once. See STONE.

In a chronical and malignant gonorrhœa, not only the proſtatæ, but often the bladder is ulcerated; whence a thick and turbid urine, with a copious ſediment, which when thrown on the coals has a moſt fetid ſmell. Likewiſe, in the ſtone in the bladder, this, or its ſphincter, is ſo eroded that the urine is thick and branny, with ſmall caruncles and filaments, which the vulgar take for worms. In the ſtrangury there is a frequent ſtimulus to make water, which is little and muddy, ſharp and ſalt, with filaments; and then there is ſome ſpaſmodic diſorder affects the ſphincter. If blood is mixed with the urine, like the waſhings of fleſh or red wine, but falls to the bottom of a purple colour, it proceeds from the kidneys; but if it be of a browniſh-black, it comes from the veins of the bladder.

Bloody URINE, or voiding blood by urine. See the article HÆMORRHAGE *of the urinary paſſages.*

Difficulty, or ſuppreſſion, of URINE. See the articles DYSURY, ISCHURY, *&c.*

When the urine of children is ſuppreſſed by viſcid humours which obſtruct the kidneys, or from the relaxed tone of the bladder, or from ſpaſmodic conſtrictions, producing pains, convulſions, and other diſorders, you may give them half a ſcruple of ſome neutral ſalt, ſuch as tartar vitriolate, arcanum duplicatum, and the like; or the ſame quantity of the ſeeds (Ray ſays the flowers) of muſcus clavellatus, lycopodium, or club-moſs, in parſley-water; it being diuretic and antiſpaſmodic. The pubes may likewiſe be anointed with oil of juniper mixed with oil of amber and aniſe-ſeed; and then a cataplaſm of roaſted onions may be laid on hot. Theſe things are likewiſe good when there is ſmall ſtones, which they expel. But if theſe fail, and the ſymptoms are urgent, a catheter muſt be introduced into the bladder; which is much eaſier in girls than boys. See the article STONE.

For the diabetes, or that diſeaſe wherein the urine comes away crude, exceeding the quantity of the liquids drank, ſee the article DIABETES.

URINE, in agriculture, is of excellent uſe as a manure; and for land, trees, *&c.* is preferable to dung; as penetrating better to the roots, and removing divers infirmities of plants.

URINOUS SALTS are the ſame with what we otherwiſe call alkali ſalts, or alkalies. See SALT and ALKALI.

URN, *urna*, a kind of vaſe, of a roundiſh form, but biggeſt in the middle, like the common pitchers, now ſeldom uſed but in the way of ornament over chimney-pieces, in buffets, *&c.* The great uſe of urns among the antients was to preſerve the aſhes of the dead after they were burnt; for which reaſon they were called cinerariæ, and urnæ cinerariæ, and were placed ſometimes under the tomb-ſtone whereon the epitaph was cut; and ſometimes in vaults in their own houſes. Urns were alſo uſed at their ſacrifices to put liquid things in.

URN was alſo a roman meaſure for things liquid. See MEASURE.

UROCRITERIUM, a caſting of water; or giving judgment on diſeaſes by the ſight of the urine. See URINE.

UROGALLUS, in ornithology, a ſpecies of the tetrao. See TETRAO.

The urogallus is of two kinds; the firſt being the urogallus, or tetrao major, with a white ſpot on the baſe of the wing, is otherwiſe called the cock of the mountain, being a very large and noble bird, nearly of the bigneſs of the turkey, and much reſembling it in figure, only that it is not ſo unweildy: the head is large and rounded: the beak is ſhort, a little hooked at the point: the eyes are large, and there is a naked ſpace over them by way of eye-brow, which is of a fine bright ſcarlet.

For the urogallus, or tetrao minor, otherwiſe called grouſe, ſee GROUSE.

URSA, the BEAR, in aſtronomy, a name common to two conſtellations of the northern hemiſphere, near the pole, diſtinguiſhed by major and minor. The urſa major, or the great bear, according to Ptolemy's catalogue, conſiſts of thirty-five ſtars: according to Tycho's, of fifty-ſix: but in the britannic catalogue we have two hundred and fifteen.

The urſa minor, or little bear, called alſo Charles's wain; and by the Greeks cynoſura; by its neighbourhood to the north pole, gives the denomination ἄρκτος, bear, thereto. Ptolemy and Tycho make it to conſiſt of eight ſtars, but Flamſteed of fourteen.

URSULINES, in church hiſtory, an order of nuns, founded originally by St. Angela of Breſcia, in the year fifteen hundred thirty-ſeven, and ſo called from St. Urſula, to whom they were dedicated. They obſerve the rule of St. Auguſtine, and are chiefly noted for taking on them the education and inſtruction of young maids: their monaſteries are a kind of ſchools where young ladies of the beſt families receive their education. The habit of theſe religious is a gown of black ſerge, or other ſtuff, tied about with a girdle of black leather. The urſulines are ſpread chiefly over France and Italy; and their different obſervances in their ſeveral monaſteries make them in truth ſo many diſtinct religious orders.

URSUS, the BEAR, in zoology. See the article BEAR.

URTICA, the ROMAN NETTLE, in botany, a genus of the *monoecia tetrandria* claſs of plants, having neither corolla nor pericarpium: the cup is connivent; the ſeed is ſingle, ovated, obtuſe, compreſſed and ſhining.

URTICA MARINA, the SEA-NETTLE, in ichthyology, a ſpecies of Meduſa, with four cavities on the under ſurface. See the article MEDUSA.

This appears, as floating on the water, to be a mere lifeleſs lump of jelly: it is of a whitiſh colour, with a caſt of bluiſh-grey, and is of an orbiculated figure, elevated into a convexity in the middle on the upper ſide, flat on the under, and furniſhed with a fringe of fine, and ſomewhat rigid, filaments round the edge, reſembling white hairs: on the under ſurface there are four cavities near the center, each of an arcuated figure, and ſurrounded with an opake line formed of about twenty-four parallel points or dots. From the very center of the under ſide there ariſe four crooked appendages, which have each a row of hairy filaments on the exterior edge; and on the upper ſurface there is an appearance of fine veſſels of a pale colour.

USAGE, in law. See PRESCRIPTION and CUSTOM.

USAGE, in language. See LANGUAGE.

USANCE, *uſo*, in commerce, is a determinate time fixed for the payment of bills of exchange, reckoned either from the day of the bills being accepted, or from the day of their date; and thus called becauſe regulated by the uſage and cuſtom of the places whereon they are drawn. See BILL *of exchange*.

Bills of exchange are drawn at one or more uſances, either from ſight or from date. The term is longer or ſhorter, according to the different countries. Uſance from London to any part of France, is thirty days; (this being declared to be a month, in regard to exchanges, in this kingdom) whether the month has more or fewer in it. Uſance from London to Hamburgh, Amſterdam, Rotterdam, Middleburgh, Antwerp, Brabant, Zealand, and Flanders, and from theſe places to London, is one calendar month after the date of the bill. Uſance, from London to Spain and Portugal, and from theſe places to London, is two calendar months after date. Uſance from London to Genoa, Leghorn, Milan, Venice, and Rome, and from theſe places to London, is three months. See the article EXCHANGE.

Uſance of Amſterdam upon Italy, Spain, and Portugal, is two months: upon France, Flanders, Brabant, Geneva, and

and upon any place in the ſeven United Provinces, is one month. Upon Frankfort, Nuremburgh, Vienna, Auſburgh, Cologne, Leipzic, and other places of Germany, as alſo upon Hamburgh and Breſlaw, is fourteen days after ſight; two uſances twenty-eight, and half uſance ſeven.

Uſance from Dantzic, Coningſberg, and Riga, upon Amſterdam, is at one month after ſight; though it is common to draw from the firſt at forty days date, and from the others at forty-one, but oftener at ten and eleven. And from Amſterdam on the ſaid places at a month's date, without mentioning uſance; though ſometimes at forty and forty-one days; and ſometimes on Breſlaw at ſix weeks date.

Moſt nations have generally agreed to allow the acceptor of a bill ſome ſmall time for payment beyond that mentioned in the bill, termed days of grace or reſpite; but they generally diſagree in the number and commencement of them. See the article DAYS *of grace*.

USE, in law, the profit or benefit of lands and tenements; or a truſt and confidence repoſed in a perſon for the holding of lands, *&c.* that he to whoſe uſe the truſt is made ſhall receive the profits.

Uſes may be limited to a perſon and the wife he ſhall marry; and if the parties to a deed agree, and declare, that one of them ſhall make a feoffment, or levy a fine, to the uſe and intent that he ſhall hold the lands for his life, and after his deceaſe another intail, and afterwards a third in fee ſimple, *&c.* the eſtate ſettles according to the uſes in the deed.

The conveyances to uſes are ſaid to be of three ſorts, *viz.* a covenant to ſtand ſeized; a feoffment, fine or recovery to uſes; and a bargain and ſale; which laſt a contingent uſe cannot be ſupported by, though it may by the two firſt.

A ſuperſtitious uſe, is where lands or goods are deviſed to a prieſt to pray for the ſouls of the dead, *&c.* in which caſe they become forfeited to the king: and where ſuch an uſe is void, and the king cannot have the land, it ſhall not reſult to the heir at law; but it may be applied to charity.

USES *and cuſtoms of the ſea*, are certain maxims or rules which form the baſis of the maritime juriſprudence, by which the policy of navigation, and the commerce of the ſea are regulated. See the article NAVY, *&c.*

Theſe uſes and cuſtoms conſiſt of three kinds of regulations: the firſt called the laws or judgments of Oleron; the ſecond, regulations made by the merchants of Wiſbuy, a city in the iſland of Gothland, in the Baltic, antiently much famed for commerce; and the third, a ſet of regulations made at Lubec, by the deputies of the Hanſe towns. See the articles OLERON, HANSE, *&c.*

USEDOM, an iſland of Pomerania, in Germany, ſituated at the mouth of the river Oder, in the Baltic-ſea: ſubject to the king of Pruſſia.

USHANT, an iſland of France, fifteen miles weſt of the coaſt of Britany, at the entrance of the Britiſh-channel.

USHER, an officer, or ſervant, who has the care and direction of the door of a court, hall, chamber, or the like.

In the king's houſhold there are two gentlemen-uſhers of the privy-chamber appointed to attend the door, and give entrance to perſons that have admittance thither; four gentlemen-uſhers, waiters; and eight gentlemen-uſhers, quarter-waiters in ordinary.

USHER alſo ſignifies an officer of the court of Exchequer, of which there are four who attend the barons and chief officers of that court at Weſtminſter, as alſo juries, ſheriffs, *&c.* at the pleaſure of the court. There is alſo an uſher of the court of chancery.

USHER *of the black rod*, the eldeſt of the gentlemen-uſhers, daily waiters at court, whoſe duty is to bear the rod before the king at the feaſt of St. George, and other ſolemnities: he has alſo the keeping of the chapter-houſe door, when a chapter of the order of the garter is ſitting, and in time of parliament attends the houſe of peers, and takes delinquents into cuſtody. He wears a gold-badge embelliſhed with the enſigns of the order of the garter. See *Black* ROD.

USK, a river of Wales, which riſes on the weſt of Brecknockſhire, and runs ſouth-eaſt through that county and Monmouthſhire, falling into the mouth of the Severn.

USNEA, in botany, a genus of moſſes, wholly deſtitute of leaves, and compoſed only of long ſlender filaments or ſtalks, which are uſually ſolid, rigid, and of a cylindric figure. The extremities, or other parts of theſe, are at times furniſhed with a ſort of orbicular bodies, dry and deſtitute of uſe, but ſeeming to ſupply the place of flowers. Theſe are hollow, in form of cups, but have no rim. The whole plants are

fixed

fixed in the manner of miſletoe to the barks of trees. Micheli has given accounts of flowers and ſeeds in theſe plants; but Dillenius ſuſpects the accuracy of this obſervation, and adds, that if there are ſuch, they are too minute to be of any ſervice in the general diſtinctions of the plants.

USQUEBAUGH, a ſtrong compound liquor, chiefly taken by way of dram.

There are ſeveral different methods of making this liquor; but the following is eſteemed one of the beſt: To two gallons of brandy, or other ſpirits, put a pound of ſpaniſh-liquorice, half a pound of raiſins of the ſun, four ounces of currants, and three of ſliced dates; the tops of baum, mint, ſavory, thyme, and the tops of the flowers of roſemary, of each two ounces; cinnamon and mace, well bruiſed, nutmegs, aniſeeds, and coriander-ſeeds, bruiſed likewiſe, of each four ounces; of citron, or lemon and orange-peel, ſcraped, of each an ounce: let all theſe infuſe forty-eight hours in a warm place, often ſhaking them together: then let them ſtand in a cool place for a week: after which the clear liquor is to be decanted off, and to it is to be put an equal quantity of neat white port, and a gallon of canary; after which it is to be ſweetened with a ſufficient quantity of double-refined ſugar.

USTION, in pharmacy, the preparing of certain ſubſtances by burning them.

USTULATION, *uſtulatio*, a word uſed by pharmaceutic writers to expreſs the roaſting or torrefying of humid or moiſt ſubſtances over a gentle fire, ſo as to render them fit for powdering. The ſame word is alſo uſed by ſome for what we call burning of wine.

USUCAPTION, *uſucaptio*, in the civil law, is an acquiſition of the property of a thing, by a poſſeſſion and enjoyment thereof for a certain term of years preſcribed by law.

USUFRUIT, *uſus-fructus*, in the civil law, the uſe or enjoyment of any lands or tenements; or the right of receiving the fruits and profits of an inheritance, or other thing, without a power of alienating or changing the property thereof.

USURER, a perſon charged with a habit or act of uſury. See USURY.

USURIOUS CONTRACT, is any bargain or contract whereby a man is obliged to pay more intereſt for money than the ſtatute allows.

USURPATION, in law, is an injurious uſing or enjoyment, of a thing for continuance of time, that belongs of right to another.

USURY, *uſura*, in the general, denotes a gain or profit which a perſon makes of his money, by lending the ſame; or it is an increaſe of the principal, exacted for the loan thereof; or the price a borrower gives for the uſe of a ſum credited to him by the lender, called, alſo, intereſt; and, in ſome antient ſtatutes, dry-exchange. See the article EXCHANGE.

The word uſury is generally taken in an evil ſenſe, *viz.* for an unlawful profit which a perſon makes of his money; in which ſenſe it is, that uſury is forbidden by the civil and eccleſiaſtical, and even by the law of nature.

By ſtat. 12 Ann. c. 16. which is called The Statute againſt Exceſſive Uſury, it is ordained, that no perſon ſhall take for the loan of any money, or other thing, above the value of five pounds for the forbearance of one hundred pounds for a year; and ſo in proportion for a greater or leſſer ſum: and it is declared, that all bonds, contracts, and aſſurances, made for payment of any principal ſum to be lent on uſury, above that rate, ſhall be void; and that whoſoever ſhall take, accept, or receive, by way of corrupt bargain, loan, *&c.* a greater intereſt than that laſt abovementioned, ſhall forfeit treble the value of the money lent; and alſo, that ſcriveners, ſolicitors, and drivers of bargains, ſhall not take or receive above five ſhillings for the procuring the loan of one hundred pounds for one year, on pain of forfeiting twenty pounds, *&c.*

There can be no uſury without a loan, between which and a bargain the court has diſtinguiſhed: and though a perſon is to pay double the ſum borrowed, *&c.* by way of penalty, for the non-payment of the principal debt, it is not uſury; ſo it alſo is in reſpect to the grant of an annuity for lives, or on condition, where it exceeds the uſual intereſt, and the proportion attending contracts of this kind. Even if one ſecures a large intereſt and principal, and it is at the will of the party who is to pay; or where it happens that both the principal money and extraordinary intereſt are in hazard, or that a perſon may have leſs than his principal; as when a bond is made to pay money upon the return of a ſhip from ſea,

ſea, &c. either of theſe caſes are not held to be uſury.

In an action brought for uſury, the ſtatute made againſt it muſt be pleaded; and in pleading an uſurious contract, as a bar to an action, the whole matter is to be ſet forth ſpecially, becauſe it lies within the party's own privity; yet on an information on the ſtatute for making ſuch contract, it is ſufficient to mention the corrupt bargain generally; becauſe matters of this kind are ſuppoſed to be privily tranſacted; and ſuch information may be brought by a ſtranger. 1 Hawk. P. C. 248. Likewiſe upon an information on the ſtatute againſt uſury, he that borrows the money may be a witneſs, after he has paid the ſame.

UT, in muſic, the firſt of the muſical notes, which, with the reſt, was taken out of the hymn of St. John Baptiſt. *Ut queant laxis*, &c. See SCALE, MUSIC, &c.

UTENSIL, *utenſile*, a little domeſtic moveable, belonging principally to the kitchen: ſuch are pots, pans, &c.

Utenſils are more particularly uſed in war, for the moveables which the hoſt is obliged to furniſh the ſoldiers, quartered with him; which are, a bed with bedclothes, a pot, and a ſpoon.

UTERINE, *uterinus*, ſomething belonging to the uterus, or womb of a woman.

Furor UTERINUS, in medicine, denotes a kind of madneſs, attended by laſcivious ſpeeches and geſtures, and an invincible inclination to venery. See FUROR.

UTERUS, the WOMB, in anatomy, a hollow body, called alſo the matrix, of a form approaching to that of a pear, ſituated between the bladder and the rectum, and deſtined to the office of generation, for the containing the fœtus. It is connected in the anterior part with the vagina, and at its lateral part by the ligaments, lata and rotunda, being looſe in its hinder part.

In women not with child, the length of the uterus is about three inches; its breadth, in the upper part, being about two inches, and in the lower part one. Its thickneſs is about an inch and an half: in virgins, indeed, it is much ſmaller than this; but in women with-child it is of a different ſize, according to the different time of geſtation.

Anatomiſts divide it into two parts; the upper and broader part they call the fundus uteri, and the lower they call the cervix, into which it is that the vagina opens. See the article VAGINA.

The orifice, or, as it is otherwiſe called, the internal mouth of the womb, opens into the vagina, in form of the glans penis in man: it is very ſmall in virgins, but in women who have had children, or who are with-child, it is larger; and in the laſt it is always cloſed up with a glutinous humour: in the time of delivery, it in a wonderful manner expands itſelf, ſo as to give paſſage to the child. See the article DELIVERY.

The ſubſtance of the womb is muſculous, being compoſed of a various plexus of fleſhy fibres, with a great number of veſſels between. In women not with-child it is compact and firm; in thoſe with-child it is ſpongy and ſinuous, and is capable of wonderful dilatation, without any diminution of its thickneſs. It is covered externally with a membrane from the peritonæum; and internally, its cavity is lined with a porous and nervous membrane: this cavity is very ſmall in virgins; and in women with child the inner membrane almoſt entirely diſappears.

The blood-veſſels of the uterus are tortuous, and make a thouſand anaſtomoſes with one another: they open by a number of little mouths into the uterus and vagina, and are the ſources of the menſtrual diſcharge in women. See the article MENSES.

The arteries are of three kinds, *viz.* ſpermatics from the aorta; very large ones from the hypogaſtrics; and others from the hæmorrhoidal arteries. The veins of the uterus are alſo of three kinds, and of the ſame denominations: they have valves, and are greatly larger than the arteries, eſpecially in women with-child. The nerves of the womb are from the intercoſtals, and thoſe of the os ſacrum. The lymphatics have long ſince been diſcovered in brutes; but Morgagni has of late years found them alſo in human ſubjects. See the articles ARTERY, VEIN, NERVE, &c.

UTILE, a latin term, ſignifying profitable, or uſeful; in which ſenſe it is ſometimes uſed by engliſh writers.

UTOXETER, a market-town of Staffordſhire, twelve miles ſouth-eaſt of Stafford.

UTRECHT, the capital of a province of the ſame name, in the united Netherlands, ſituated twenty-three miles ſouth eaſt of Amſterdam.

UTRICULARIA, in botany, a genus of the *diandria-monogynia* claſs of plants, with a ringent, bilabiated, monopetal-

ous

ous flower; and its fruit a large, globoſe, and unilocular capſule, containing a number of ſmall ſeeds.

UVA URSI, in botany, a name uſed by Tournefort for a ſpecies of arbutus. See the article ARBUTUS.

UVEA, in anatomy, the third or outermoſt coat of the eye. See EYE.

VULCANO, or VOLCANO, in natural hiſtory, a burning mountain, or one that vomits forth fire, flame, aſhes, cinders, &c. See MOUNTAIN.

As to the cauſe of vulcanos, it is found by experience, that there are ſeveral inflammable bodies, which, being mixed together in due proportion, will kindle into flame by fermentation alone, without the help of any fiery particles. Thus M. Lemery having covered up in the earth about fifty pounds of a mixture, compoſed of equal parts of ſulphur and filings of iron, tempered with water; after eight or nine hours time, the earth, where it lay, vomited up flames. From this experiment we ſee the true cauſe of the fire of Ætna, Veſuvius, and other burning mountains, which probably are made up of ſulphur and ſome other matter proper to ferment with it, and take fire. See ÆTNA, VESUVIUS, &c.

VULGATE, a very antient latin tranſlation of the bible, and the only one the church of Rome acknowledges authentic. See BIBLE.

The antient vulgate of the Old Teſtament was tranſlated almoſt word for word from the greek of the LXX. The author of the verſion is not known, nor ſo much as gueſſed at.

VULNERARIA, in botany, Tournefort's name for the anthyllis of Linnæus. See the article ANTHYLLIS.

VULNERARY, in medicine, an epithet given to remedies proper for the cure of wounds and ulcers.

All medicines of this intention are ſuppoſed both to cleanſe and heal; that is, incarnate, or fill up with new fleſh, all ulcerations and foulneſſes. Under this head are ranged all ſuch balſamics as are not only ſoftening and adheſive, but alſo, by a peculiar activity, joined with a ſuitable configuration of parts, are apt to abrade and carry along with them what particles they lay hold on in their paſſage.

VULPES, the FOX. See FOX.

VULTUR, a genus of birds, the characters of which are as follow: there are four toes on each foot, and three of theſe are placed forwards; the neck is long, and almoſt bare of feathers; the legs are covered with feathers down to the feet, or nearly ſo; and under the throat there is a ſpace covered with hairs inſtead of feathers; the head alſo, in many ſpecies, is naked, and has at the moſt only a downy matter on it, inſtead of feathers; and the under part of the wings is downy.

This genus comprehends the black vultur, the bœtic vultur, the hare-catcher, the golden-breaſted vultur, the brown vultur, and braſilian vultur.

VULVA, in anatomy, a name given as well to the uterus, or womb, as to the cunnus, or pudendum muliebre. See the articles UTERUS and PUDENDUM.

UVULA, in anatomy, a round, ſoft, ſpongious body, like the end of a child's finger, ſuſpended from the palate, near the foramina of the noſtrils, perpendicularly over the glottis. Its uſe is to break the force of the cold air, and prevent its entering too precipitately into the lungs. It is formed of a duplicature of a membrane of the palate; and is called, by ſome authors, columella, and by others gurgulio.

It is moved by two pair of muſcles, and ſuſpended by as many ligaments.

UVULARIA, in botany, a genus of the *hexandria-monogynia* claſs of plants, the flower of which conſiſts of ſix very long lanceolated petals; and its fruit an ovato-oblong trilocular capſule, containing ſeveral roundiſh and compreſſed ſeeds.

UXBRIDGE, a market-town of Middleſex, ſituated on the river Colne, fifteen miles weſt of London.

UXOR, among chemiſts, ſignifies the mercury of metals. See MERCURY and METAL.

UXORIUM, in antiquity, a fine or forfeit paid by the Romans, for not marrying. See the article MARRIAGE.

UZBECK, or OUSBECK, TARTARY, a large country of Aſia, bounded by Calmuc Tartary on the north, by Tibet on the eaſt, by India and Perſia on the ſouth, and by a great deſart, which ſeparates it from the Caſpian ſea, on the weſt.

UZES, a town of Languedoc, in France, ſixteen miles north of Niſmes.

UZIFIR, UZUFAR, or UZIFUR, in chemiſtry, a name which ſome authors give to cinnabar. See CINNABAR.

W

W, or w, is the twenty-first letter of our alphabet, and is compoſed, as its name implies, of two v's. It was not in uſe among the Hebrews, Greeks, or Romans, but chiefly peculiar to the northern nations, the Teutones, Saxons, Britons, *&c.* But ſtill it is not uſed by the French, Italians, Spaniards, or Portugueſe, except in proper names and other terms borrowed from languages in which it is originally uſed, and even then it is ſounded like the ſingle v. This letter is of an ambiguous nature, being a conſonant at the beginning of words, and a vowel at the end. It may ſtand before all the vowels except *u*, as *water*, *wedge*, *winter*, *wonder*: it may alſo follow the vowels *a*, *e*, *o*, and unites with them into a kind of double vowel, or diphthong, as in *ſaw*, *few*, *cow*, *&c.* It alſo goes before *r*, and follows *s* and *th*, as in *wrath*, *ſwear*, *thwart*; it goes before *h* alſo, though in reality it is ſounded after it, as in *when*, *what*, *&c.* In ſome words it is obſcure, as in *ſhadow*, *widow*, *&c.*

WAAG, a river of Hungary, which riſes in the Carpathian mountains, on the confines of Poland, and running firſt from eaſt to weſt, then turns ſouth, and paſſing by Leopoldſtadt, falls into the Danube, oppoſite to the iſland of Schut.

WAAL, a river of the united Netherlands, being one of the branches of the Rhine, which runs from eaſt to weſt, through the Betue, in the province of Gelderland, paſſing by Nimeguen, Tiel, Bommel, and Gorcum, and, continuing its courſe eaſtward, unites its waters with the Maes, and, paſſing by Dort, falls into the German ſea below the Briel.

WADD, or WADDING, is a ſtopple of paper, hay, ſtraw, or the like, forced into a gun upon the powder, to keep it cloſe in the chamber; or to put up cloſe to the ſhot, to keep it from rolling out. See the article GUN, *&c.*

WAFE. See the article WAIF.

WAFT. To waft a ſhip, is to convoy her ſafe, as men of war do merchant-ſhips. To make a waft, is to hang out ſome coat, ſea-gown, or the like, on the main-ſhrouds of the ſhip, as a ſignal for people to come aboard, and ſignifying that the ſhip is in great diſtreſs.

WAFERS, or *Sealing* WAFERS, are made thus: take very fine flour, mix it with glair of eggs, iſinglaſs, and a little yeaſt; mingle the materials; beat them well together, ſpread the batter, being made thin with gum-water, on even tin-plates, and dry them in a ſtove; then cut them out for uſe.

You may make them of what colours you pleaſe, by tinging the paſte with brazil or vermilion for red; indigo or verditer, *&c.* for blue; ſaffron, turmeric, or gambooge, *&c.* for yellow.

Wafers, on importation, pay a duty of of $4\frac{7\,8\frac{3}{4}}{100}$d. the pound, and draw back on exportation $4\frac{3\,1\frac{1}{2}}{100}$d. the pound.

WAGE, in law, denotes the giving ſecurity for the performance of any thing.

WAGER *of law*, is uſed where an action of debt is brought againſt a perſon, upon a ſimple contract between the parties, without deed or record, and the defendant, in preſence of his compurgators, ſwears in court, that he owes the plaintiff nothing, in form and manner as he has declared: and here the reaſon of waging of law is, becauſe the defendant may have paid to the plaintiff his debt in private, or before witneſſes who may be all dead, and therefore the law allows him to wage his law in his diſcharge; and in that caſe, his oath ſhall be accepted to diſcharge himſelf, rather than the law will ſuffer him to be charged upon the bare allegation of the plaintiff. The method of waging law is this, *viz.* the defendant generally brings ſix compurgators with him into court, and ſtands at the end of the bar towards the right hand of the chief juſtice; the ſecondary aſks him, whether he will wage his law? whereto if he anſwers that he will, the judges admoniſh him to be well adviſed, telling him the danger of taking a falſe oath; and if he ſtill perſiſts, then the ſecondary ſays, and the defendant, who wages his

law, repeats after him, "Hear this, ye juſtices, that I C. D. do not owe to A. B. the ſum of , nor any penny thereof, in manner and form as the ſaid A. B. has declared againſt me: ſo help me God." After the defendant has thus ſworn, and the compurgators given in, upon oath, that they believe he ſwears true, the plaintiff is for ever barred; it being as much as if a verdict had paſſed againſt him.

WAGGON, a vehicle or carriage, of which there are various forms, accommodated to the different uſes they are intended for. The common waggon conſiſts of the ſhafts or rads, being the two pieces which the hind horſe bears up; the welds; the ſlotes, or croſs pieces, which hold the ſhafts together; the bolſter, being that part on which the fore wheels and the axle-tree turn, in wheeling the waggon a-croſs the road; the cheſt, or body of the waggon, having the ſtaves or rails fixed thereon; the bales, or hoops, which compoſe the top; the tilt, the place covered with cloth, at the end of the waggon. For the principles on which this carriage is conſtructed, ſee the article WHEEL-CARRIAGE.

WAGININGEN, a town of the United Provinces, in the province of Gelderland, ſituated on the river Lech, eight miles north weſt of Nimeguen.

WAGRIA, the eaſtern diviſion of the dutchy of Holſtein, in the circle of lower Saxony, in Germany, bounded by the Baltic ſea on the north, eaſt, and ſouth.

WAGTAIL, in ornithology, the name of two different ſpecies of motacilla. See the article MOTACILLA.

The white or common wagtail is the motacilla with a black breaſt. This is a very beautiful bird, much about the ſize of the goldfinch, but the body is longer in proportion, and much better covered with feathers; the head is large and rounded; the eyes are large, and their iris hazel; the beak is ſtrait, ſlender, moderately long and black; the beak and the eyes are ſurrounded with a ſpace of white, which is continued in a broad line down almoſt to the wings; the crown of the head, both ſides of the neck, and back are black, the breaſt and belly are white; the tail is long, and both that and the wings are variegated with black and white. See plate CCXCVI. fig. 3.

The other ſpecies is the yellow wagtail, or the yellow-breaſted motacilla, much reſembling the former, only that the breaſt and belly are yellow; the ſides of the head variegated with ſome ſtrokes of yellow, and the wings with white.

WAIF, or WAFE, in law, a term applied to ſuch goods as a thief having feloniouſly ſtolen, on his being cloſely purſued, are waved or left by the felon, which become forfeited to the king, or lord of the manor: and ſo it alſo is where a felon has the goods in his cuſtody, and apprehending that purſuit is made, he flies, and leaves them behind him. Tho' waif is properly applied to goods that are ſtolen, yet it may be alſo ſaid of goods not ſtolen or taken away, as where a perſon is purſued with hue and cry as a felon, and he flies and leaves his own goods; in this caſe theſe ſhall be forfeited as ſtolen goods, or what are uſually called fugitives goods.

Waif is alſo applied to things loſt, and eſtrays, which, no owner appearing, are forfeited to the lord of the manor, after they have been cried and publiſhed in the markets.

WAIGRATS STRAITS, ſituated between Nova Zembla and Ruſſia, through which the Dutch ſailed to the north, as high as 75°, in order to diſcover a north-eaſt paſſage to China, and the Eaſt-Indies.

WAIN, in aſtronomy. See URSA.

WAINFLEET, a market-town of Lincolnſhire, thirty-five miles eaſt of Lincoln.

WAINSCOT, in building, the timber-work that ſerves to line the walls of a room, being uſually made in pannels, and painted, to ſerve inſtead of hangings. It is uſual even in halls to have wainſcot breaſt high, by reaſon of the natural moiſtneſs of the walls. Some joiners put charcoal behind the pannels, to prevent the ſweat of the ſtone and brick walls from unglueing the joints; others uſe wool for the ſame purpoſe, but the only ſure way is to prime over the back ſides of the joints with white lead, ſpaniſh brown, or linſeed oil.

The wainſcotting with norway oak, according to Neve, the workman finding ſtuff, is valued at 6s. or 7s. per yard ſquare; plain ſquare wainſcotting, the workman finding deal, is valued at 3s. and 3s. 6d. per yard. Ordinary biſſection wainſcotting, the workman finding deal, is worth 3s. and 6d. and 4s. per yard. Large biſſection wainſcotting, with dantzick ſtuff, is valued at 6s. or 7s. per yard.

WAIVE, according to the general acceptation of the word, ſignifies to forſake; but in the law it is eſpecially applied to a woman,

a woman, who, for any crime, for which a man may be outlawed, is termed waive.

WAIVER, in law, denotes the paſſing by of a thing, or a refuſal to accept thereof; and relates ſometimes to an eſtate conveyed to a perſon, and ſometimes to a plea. It is held, where a particular eſtate is granted with a remainder over, in that caſe, he that has it, may not regularly waive it to the damage of him in remainder; though where one has the reverſion it is otherwiſe, for that is not hurt by ſuch waiver.

WAKE *of a ſhip*, is the ſmooth water aſtern when ſhe is under ſail: this ſhews the way ſhe has gone in the ſea, whereby the mariners judge what way ſhe makes. For if the wake be right a-ſtern, they conclude ſhe makes her way forwards; but if the wake be to leeward a point or two, then they conclude ſhe falls to the leeward of her courſe. When one ſhip, giving chaſe to another, is got as far into the wind as ſhe, and ſails directly after her, they ſay, ſhe has got into her wake. A ſhip is ſaid to ſtay to the weather of her wake, when in her ſtaying, ſhe is ſo quick, that ſhe does not fall to leeward upon a tack, but that when ſhe is tacked, her wake is to the leeward; and it is a ſign ſhe feels her helm very well, and is quick of ſteerage.

WAKE, is the eve feaſt of the dedication of churches, which is kept with feaſting and rural diverſions.

WAKEFIELD, a market-town in the weſt-riding of Yorkſhire, ſituated on the river Caulder, twenty four miles ſouth-weſt of York.

WALACHIA, a province of Turkey in Europe, bounded by the Irongate mountains, which ſeparate it from Tranſilvania, on the north-weſt; by Moldavia on the north-eaſt; by the river Danube, which ſeparates it from the province of Bulgaria, on the ſouth-eaſt; and the ſame river ſeparates it from the province of Servia on the ſouth-weſt. It is two hundred miles long, and one hundred broad.

WALCOURT, a town of the biſhopric of Liege, ſituated on the confines of Namur, eight miles ſouth of Charleroy.

WALDEC, a town of Germany, in the circle of the upper Rhine, and landgraviate of Heſſe Caſſel, twenty miles ſouth-weſt of Heſſe Caſſel city.

WALDEN, a market-town of Eſſex, ſituated twenty-five miles north-weſt of Chelmsford.

WALE, or WALES, in a ſhip, thoſe outermoſt timbers in a ſhip's ſide, on which the ſailors ſet their feet in climbing up. They are reckoned from the water, and are called her firſt, ſecond, and third wale, or bend. See SHIP.

WALE KNOT, a round knot or knob made with three ſtrands of a rope, ſo that it cannot ſlip, by which the tacks, top-ſail ſheets, and ſtoppers are made faſt, as alſo ſome other ropes.

WALE REARED, on board a ſhip, a name the ſeamen give to a ſhip, which, after ſhe comes to her bearing, is built ſtrait up this way of building, though it does not look well; nor is, as the ſeamen term it, ſhip ſhapen; yet it has this advantage, that a ſhip is thereby more roomy within board, and becomes thereby a wholeſome ſhip at ſea, eſpecially if her bearing be well laid out.

WALES, a principality in the weſt of England, comprehending twelve counties, bounded by Cheſhire, Shropſhire, Herefordſhire, and Monmouthſhire, on the eaſt, and ſurrounded by the ſea called the Iriſh Channel, on the north, weſt, and ſouth.

New WALES, the ſouth-weſt coaſt of Hudſon's Bay, in north America, ſo called; now poſſeſſed by the engliſh Hudſon's Bay company.

WALKER, the ſame with foreſter, ſee FORESTER.

WALK, in gardening. See ALLEY.

Thoſe made of gravel, ſand, or graſs, are the moſt common in England; but where gravel or ſand cannot be procured, they are ſometimes laid with powdered coal, ſea-coal aſhes, or powdered brick. In order to the laying of gravel walks, it is very proper that the bottom of them be filled with ſome lime-rubbiſh, coarſe gravel, flint-ſtones, or other rocky materials. This bottom ſhould be laid eight or ten inches thick, over which the coat of gravel ſhould be ſix or eight. The common allowance for a gravel walk of five feet breadth, is an inch in the crown; ſo that if a walk be twenty feet wide, according to this proportion, it will be four inches higher in the middle than on each ſide; and a walk of twenty-five feet will be five inches; one of thirty feet ſix inches; and ſo on. In order to lay gravel-walks firm, it will be neceſſary to give them three or four water rollings; that is, they muſt be rolled, when it rains ſo very faſt, that the walks ſwim with water: this will cauſe the gravel to bind.

iron-mould gravel is the beſt for binding; or gravel with a little binding loam amongſt it. The beſt gravel for walks is ſuch as abounds with ſmooth pebbles, which, being mixed with a due proportion of loam, will bind like a rock, and is never injured by wet or dry weather. The width of the walks muſt always be proportioned to their length, and the ſize of the garden. For farther particulars, ſee GRAVEL.

Graſs walks in a garden are both ornamental and delightful. See GRASS.

Sand walks are alſo frequently made in gardens, as being leſs expenſive in the making and keeping, than the former; for as the greateſt part of the walks made in gardens twiſt about in an irregular manner, it would be very difficult to keep them handſome if they were made of gravel; and as the walks are for the moſt part ſhaded with trees, ſo the dripping of the water from their branches in hard rains, would waſh the gravel in holes, and render the walks very unſightly. When the ground is traced out in the manner the walks are deſigned in, the earth ſhould be taken out of the walks, and laid in the quarters. The depth of this ſhould be proportioned to the nature of the ſoil; for where the ground is dry, the walks need not be elevated much above the quarters; ſo the earth ſhould be taken out four or five inches deep in ſuch places: but where the ground is wet, the bottom of the walks need not be more than two inches below the ſurface, that the walks may be raiſed ſo high as to throw off the wet into the quarters. After the earth is taken out, the bottom of the walks ſhould be laid with rubbiſh four or five inches thick, and beaten down as cloſe as poſſible; then the ſand ſhould be laid on about three inches thick; and after treading it down, it ſhould be raked over, to level and ſmooth the ſurface. In doing of this, the whole ſhould be laid a little rounding, to throw off the wet but there will be no neceſſity of obſerving any exactneſs therein; for as the whole ground is to have as little appearance of art as poſſible, the rounding ſhould appear natural, and only ſo contrived, as that the water may have free paſſage off.

WALK, in the manege, is the ſloweſt, and leaſt raiſed of all a horſe's goings. It is performed by the horſe's lifting up his two legs on a ſide, the one after the other, beginning with the hind leg firſt. Thus, if he leads with the legs of the right ſide, then the firſt foot he lifts is the far hind-foot, and in the time he is ſetting it down (which in a ſtep is always ſhort of the tread of his fore-foot on the ſame ſide) he lifts his far fore-foot, and ſets it down before his near fore-foot. Again, juſt as he is ſetting down his far fore-foot, he lifts up his near hind-foot, and ſets it down again juſt ſhort of his near fore-foot; and juſt as he is ſetting it down, he lifts his near fore-foot, and ſets it down beyond his far fore-foot.

WALL, in architecture, the principal part of a building, as ſerving both to incloſe it, and ſupport the roof, floors, &c. See the article BUILDING.

Walls are diſtinguiſhed into various kinds, from the matter whereof they conſiſt, as plaſtered or mud-walls, brick-walls, ſtone-walls, flint, or boulder walls, and boarded walls. In all which theſe general rules are to be regarded. 1. That the right angle therein depending is the true cauſe of all ſtability, both in artificial and natural poſition. 2. That the maſſieſt and heavieſt materials be the loweſt, as fitter to bear than to be borne. 3. That the walls, as they riſe, diminiſh proportionably in thickneſs, for eaſe both of weight and expence. 4. That certain courſes or ledges, of more ſtrength than the reſt, be interlaid, like bones, to ſtrengthen the whole fabrick. See the article HOUSE, &c.

Brick-walls are the moſt important and uſual amongſt us. In theſe, particular care is to be taken about laying of the bricks; that in ſummer they be laid as wet, and in winter as dry, as poſſible, to make them bind the better with the mortar: that in ſummer, as faſt as they are laid, they be covered up, to prevent the mortar, &c. from drying too faſt: that in winter they be covered well to protect them from rain, ſnow, and froſt, which are all enemies to mortar: that they be laid joint on joint in the middle of the walls as ſeldom as may be: but that good bond be made there as well as on the outſide. Care is to be taken that the angles be firmly bound, which are the nerves of the whole edifice. In order to which, in working up the walls of a building, it is not adviſeable to raiſe any wall above eight feet high, before the next adjoining wall be wrought up to it, that ſo good bond may be made in the progreſs of the work: it may be worth notice, that a wall a brick and a half thick, with the

joint, will be in thickneſs fourteen inches, or very near; whence 150 or 160 bricks will lay a yard ſquare meaſured upon the face of the building; and to the ſquare of ten foot are uſually allowed 1700 or 1800 bricks. Flint, or boulder walls are much uſed in ſome parts of Suſſex and Kent, for fence-walls, round courts, gardens, &c. A right and left handed man fits well for this work, as they have a hod of mortar poured down upon the work, which they part between them, each ſpreading it towards himſelf, and ſo they lay in the flints. The mortar for this work muſt be very ſtiff.

WALL, in gardening. Of all materials for building walls for fruit-trees, brick is the beſt; it being not only the handſomeſt, but the warmeſt and kindeſt for the ripening of fruit; and affording the beſt conveniency for nailing, as ſmaller nails will ſerve in brick than will in ſtone-walls, where the joints are larger; and if the walls are caped with free-ſtone, and ſtone pilaſters or columns at proper diſtances, to ſeparate the trees, and break off the force of the winds, they are very beautiful, and the moſt profitable walls of any others. In ſome parts of England there are walls built both of brick and ſtone, which are found very commodious. The bricks of ſome places are not of themſelves ſubſtantial enough for walls; and therefore ſome perſons, that they might have walls both ſubſtantial and wholeſome, have built theſe double, the outſide being of ſtone, and the inſide of brick. but there muſt be great care taken to bond the bricks well into the ſtone, otherwiſe they are very apt to ſeparate one from the other, eſpecially when froſt comes after much wet.

There have been ſeveral trials made of walls built in different forms; ſome of them having been built ſemicircular; others in angles of various ſizes; and projecting more towards the north, to ſcreen off the cold winds: but there has not as yet been any method which has ſucceeded near ſo well as that of making the walls ſtrait, and building them upright. Where perſons are willing to be at the expence, in the building of their walls ſubſtantial, they will find it anſwer much better than thoſe which are ſlightly built, not only in duration, but in warmth: therefore a wall two bricks thick, will be found to anſwer better than that of one brick and a half: and if in building of garden-walls they are grouted with ſoft mortar, to fill and cloſe all the joints, the walls will be much ſtronger, and the air will not ſo eaſily penetrate, as it does through thoſe which are commonly built.

For the aſpect or ſituation of garden-walls, ſee the article EXPOSURE.

WALLINGFORD, a borough town of Berkſhire, ſituated on the river Thames, twelve miles north of Reading.

WALLOONS, the inhabitants of a conſiderable part of the ſpaniſh Netherlands, *viz.* thoſe of Artois, Hainault, Namur, Luxemburgh, and part of Flanders and Brabant.

The walloon language is ſaid to have been that of the antient Gauls or Celts.

WALRUS, in zoology, the engliſh name of the phoca, with the canine teeth exerted. See PHOCA.

This is much larger than the ſea-calf, or phoca, with the canine teeth covered; growing to the ſize of the largeſt ox; the head is very large, and almoſt of a rounded figure; the eyes are large and prominent; there are no ears, but only an aperture on each ſide of the head, of an oblong form, and not very large; the noſe is obtuſe; the noſtrils large, and the creature contracts and dilates them at pleaſure; the mouth is very large, and the upper part of it furniſhed with thick and cartilaginous whiſkers; the tongue is ſhort, the canine teeth of the upper jaw are of an enormous length and ſize, and they hang downwards and forwards toward the breaſt; the creature uſes theſe ſtrange weapons to climb upon the ice, and to hang itſelf to the rocks in its getting on ſhore to ſleep.

WALNUT-TREE, juglans, in botany. See the article JUGLANS.

WALSALL, a market-town of Staffordſhire, thirteen miles ſouth of Stafford.

WALSHAM, a market-town of Norfolk, eleven miles north of Norwich.

WALSINGHAM, a market-town of Norfolk, eighteen miles north-weſt of Norwich.

WALTHAM, a market-town of Leiceſterſhire, ſixteen miles north-eaſt of Leiceſter.

WALTHERIA, in botany, a genus of the *monadelphia pentandria* claſs of plants, the flower of which conſiſts of five petals, vertically cordated and patent: the fruit is an unilocular bivalve capſule, vertically ovated, and the ſeed is ſingle, obtuſe, and broadeſt at top.

WANGEN, a market-town of Germany, in the circle of Suabia, twenty-five miles eaſt of Conſtance.

WANLASS, in hunting. Driving the wanlaſs, is the driving of deer to a ſtand, that the lord may have a ſhoot, which is one of the cuſtomary ſervices of fiefs.

WANTAGE, a market-town of Berkſhire, fifteen miles ſouth of Oxford.

WAPENTAKE (from the Saxon) the ſame with what we call a hundred, and more eſpecially uſed in the northern counties beyond the river Trent. There have been ſeveral conjectures as to the original of the word; one of which is, that antiently muſters were made of the armour and weapons of the inhabitants of every hundred; and from thoſe that could not find ſufficient pledges of their good abearing, their weapons were taken away, and given to others; whence it is ſaid this word is derived. See HUNDRED.

WAR, a conteſt or difference between princes, ſtates, or large bodies of people; which not being determined by the ordinary meaſures of equity and juſtice, is referred to the deciſion of the ſword.

Holy WAR, is that antiently maintained by leagues and croiſades, for the recovery of the holy-land. See CROISADE.

Council of WAR. See COUNCIL.

Man of WAR. See SHIP, RATE, *&c.*

Place of WAR. See PLACE.

WARADIN *little*, a town of Upper Hungary, twenty-three miles eaſt of Tockay, eaſt long. 21° 20′, north lat. 48° 18′.

WARADIN *great*, a town of Upper Hungary, an hundred miles eaſt of Buda: eaſt long. 21° 50′, north lat. 47° 15′.

WARD, in law-books, a word of divers ſignifications: thus, a ward in London, is a part of the city committed to the ſpecial charge of one of the aldermen of the city. There are twenty-ſix wards in London, which are as hundreds, and the pariſhes thereof as towns. A foreſt is alſo divided into wards, and ſo are moſt of our hoſpitals.

WARD, WARDA, or WARDAGIUM, is alſo uſed, in our antient writings, for the cuſtody of a town or caſtle, which the tenants and inhabitants were bound to keep at their own charge.

WARD-HOOK, or WADD-HOOK, in gunnery, a rod or ſtaff with an iron end turned ſerpent-wiſe, or like a ſcrew to draw the wadding out of a gun when it is to be unloaded. See WADD.

WARDA ECCLESIARUM, denotes the guardianſhip of churches; which is in the king, during vacancies, by reaſon of the regalia or temporalities.

WARDEN, or GUARDIAN, one who has the charge or keeping of any perſon, or thing, by office. See GUARDIAN.

Such is the warden of the fleet, the keeper of the fleet-priſon; who has the charge of the priſoners there, eſpecially ſuch as are committed from the court of chancery for contempt.

Warden, in an univerſity, is the head of a college; anſwering to what in other colleges we call the maſter thereof.

Warden, or lord warden of the cinque ports, is the governor of theſe noted havens; who has the authority of an admiral, and ſends out writs in his own name.

Warden of the mint, is an officer whoſe buſineſs it is to receive the gold and ſilver bullion brought in by the merchants to pay them for it, and overſee the other officers. He is called keeper of the exchange and mint.

Church-WARDENS. See CHURCH.

WARDHUYS, a port of Norwegian Lapland, 120 miles ſouth-eaſt of the north-cape: eaſt long. 28°, and north lat. 71°.

WARDMOTE, in London, is a court ſo called which is kept in every ward of the city, anſwering to the curiata comitia in antient Rome. See COURT.

WARDROBE, a cloſet, or little room adjoining to a bed-chamber, ſerving to diſpoſe and keep a perſon's apparel in; or, for a ſervant to lodge in, to be at hand to wait, *&c.*

Wardrobe, in a prince's court, is an apartment wherein his robes, wearing apparel, and other neceſſaries are preſerved under the care and direction of proper officers; as the maſter of the wardrobe, clerk, *&c.* of the wardrobe. See MASTER and CLERK.

WARE, a market-town of Hertfordſhire, under the meridian of London, and twenty miles north of that city.

WAREHAM, a borough of Dorſetſhire, ſeventeen miles eaſt of Dorcheſter.

WARMINSTER, a market-town of Wiltſhire, ſeventeen miles north-weſt of Saliſbury.

WARN, in law, is to ſummon a perſon to appear in a court of juſtice. See the article SUMMONS.

WARNEMUNDE, a town of Lower Saxony, twenty-ſix miles north-eaſt of Wiſmar: eaſt long. 12° 15′, and north lat. 54° 30′.

WARNETON, a town of Flanders, ſeven miles north weſt of Liſle.

WARNING-PIECE, in the military art, is the gun which is fired every night about ſun-ſet, to give notice to the drums and trumpets of the army to beat and ſound a retreat or tattou, which is likewiſe called, ſetting the watch. See the article RETREAT.

WARNING-WHEEL, in a clock, is the third or fourth, according to its diſtance from the firſt wheel. See CLOCK.

WARP, in the manufactures, is the threads, whether of ſilk, wool, linen, hemp, *&c.* that are extended lengthwiſe on the weaver's loom; and a-croſs which the workman by means of his ſhuttle paſſes the threads of the woof, to form a cloth, ribband, fuſtian, or other matter.

For a woollen ſtuff to have the neceſſary qualities, it is required that the threads of the warp be of the ſame kind of wool, and of the ſame fineneſs throughout; that they be ſized with flanders or parchment-ſize, well prepared, and that they be in ſufficient number with regard to the breadth of the ſtuff to be wrought.

To warp a ſhip, is to ſhift her from one place to another, when the wind and tide will permit it without danger.

WARRANT, an act, inſtrument, or obligation, whereby a perſon authoriſes another to do ſomething which he otherwiſe had not a right to do.

Warrant of attorney, is that whereby a man appoints another to do ſomething in his name, and warrants his action. It ſeems to differ from a letter of attorney which paſſes under hand and ſeal of him who makes it, before creditable witneſſes; whereas warrant of attorney, in perſonal, mixed, and ſome real actions, is put in of courſe by the attornies for the plaintiffs or defendants.

WARRANTY, *warrantia*, a promiſe or covenant by deed, made by the bargainer for himſelf and his heirs, to warrant and ſecure the bargainee and his heirs againſt all men for enjoying the thing agreed on between them.

WARRANTIA CHARTÆ, a writ that lies for a perſon who is enfeoffed in lands and tenements, with clauſe of warranty, and is impleaded in an aſſize, or writ of entry, wherein he cannot vouch or call to warranty. See VOUCHER.

WARRANTIA DIEI, a writ which lies in caſe where a man, having a day aſſigned perſonally to appear in court to an action, wherein he is ſued, is, in the mean time, by commandment employed in the king's ſervice; ſo that he cannot come at the day aſſigned. It is directed to the juſtices, ordering them not to find or record him in default.

WARREN, *warrena*, a franchiſe, or placed privileged either by preſcription or grant from the king, to keep beaſts and fowl of warren in; as rabbits, hares, partridges, pheaſants, *&c.*

By a ſtatute 21 Edward III. a warren may lie open, and there is no need of cloſing it in, as there is a park.

In the ſetting up a warren, great caution is to be uſed for the fixing upon a proper place, and a right ſituation. It ſhould always be upon a ſmall aſcent, and expoſed to the eaſt or the ſouth. The ſoil that is moſt ſuitable, is that which is ſandy; for when the ſoil is clayey or tough, the rabbits find greater difficulty in making their burrows, and never do it ſo well; and if the ſoil be boggy or mooriſh, there would be very little advantage from the warren, for wet is very deſtructive of theſe animals.

All due precautions muſt be taken, that the warren be ſo contrived, that the rabbits may habituate themſelves to it with eaſe. Many would have it that warrens ſhould be encloſed with walls; but this is a very expenſive method, and ſeems not neceſſary nor adviſeable; for we find but very few that are ſo, and thoſe do not ſucceed at all the better for it.

WARRINGTON, a market-town of Lancaſhire, ſeventeen miles eaſt of Liverpool.

WARSAW, the capital of Warſovia, and of the kingdom of Poland: eaſt long. 21° 5′, and north lat. 52° 15′.

WARSOVIA, or MASSOVIA, a province of Poland, bounded by Pruſſia, on the north; by Polachia, on the eaſt; by the province of Little Poland on the ſouth; and by that of Great Poland on the weſt.

WART, *verruca*, in ſurgery, a little round hard excreſcence ariſing on the fleſh like a pea.

A wart begins at the cutis, and ſeems to be either an effloreſcence of the ſerum of the blood, which hardening in the ſurface of the ſkin makes a dry tumor; or elſe ſome ſmall luxuriancy of the little arteries of the cutis, which thruſt themſelves out, making a petty ſarcoma, which we call a ſoft wart. See SARCOMA.

According to the variety of the tumor, it is ſometimes whole with a ſmooth ſurface, ſometimes chapped and uneven.

The

The method of cure which deſerves to be firſt mentioned, is by ligature or vincture; this is performed upon ſuch of theſe excreſcences as are ſlender about the roots, and in a manner pendent, by firmly tying about them an horſe-hair, or a ſilken or linen-thread. The warts, being deprived of the juices which nouriſh them through a conſtriction of the veſſels by the ligature, gradually wither and fall away.

Another method of cure, is the ſurgeon's inſtrument, in which the wart is taken up by an hook, or forceps, and then very nicely ſeparated by the ſciſſars. The wound is treated for ſome time with an application of the lapis infernalis, or ſome other corroding medicine, that, if any part of a root ſhould remain, from which a new tubercle might ariſe, it might be conſumed and deſtroyed. See WOUND.

The cure by cauſtics is beſt performed by cutting off the hard upper part of the wart, with a razor or ſciſſars, and then ſurrounding its bottom with a circle of wax, to prevent the ſpreading of the remedies; to touch it daily with oil of tartar, ſpirit of ſalt, aqua-fortis, or butter of antimony. See CAUSTIC.

The cure by cautery is performed by chooſing a cautery of a proper ſize, and with that burning down to the root of the wart. This is the moſt painful of all the methods of extirpating theſe excreſcences; but the pain is but for a moment, and the warts extirpated this way never return again.

The cure by evulſion is performed by anointing them with ſoftening ointment, and then ſeizing them artfully between the thumb and fore-finger, and forcibly wrenching them out. This is a mountebank method, and a bad one; for it is not only very painful, but the warts commonly grow up again.

When warts are found to look livid and blue, it is beſt to let them alone entirely; becauſe when irritated, they frequently degenerate into a cancer. See the article CANCER.

WARTA, a town of Great Poland, ſituated on a river of the ſame name, fifty-ſeven miles ſouth-eaſt of Poſna.

WARTENBURG, a town of Sileſia, twenty miles north eaſt of Breſlaw.

WARWICK, the capital of Warwickſhire, ſituated on the river Avon, eighty miles north-weſt of London: weſt long. 1° 32′, north lat. 52° 20′.

WARWICK, is alſo a town of Flanders, eight miles ſouth-eaſt of Ypres.

WASEIGNE, a town of the auſtrian Netherlands, nine miles north of Namur.

WASH, among diſtillers, the fermentable liquor uſed by the malt-diſtillers. See the article DISTILLERY.

It ſhould be about the ſtrength of the ten ſhilling ſmall-beer; and if the ſpirit be expected fine, it had better be too thin than too thick. It is only made by mixing the water hot with the malt ground into meal. If the water be too hot, the mixture will become gluey; and if too cool, a part of the virtue of the malt will be loſt. Under the right application of the water is to be conſidered the proper manner of agitating the maſs, ſo that all the parts of the aqueous fluid may come fully and freely in contact with the ſoluble particles of the ſubject. When once the water is well ſaturated by ſtanding on the malt a proper time, it muſt be drawn off, and freſh poured on, till at length the whole virtue, or all the ſugary ſweetneſs of the malt is extracted, and nothing but a fixed huſky matter remains behind, incapable of being farther diſſolved by the action of hot or boiling water; or of being advantageouſly waſhed or rinſed out by the bare affuſion of cold. This artificial and external agitation or ſtirring about of the maſs, is neceſſary not only in the common way of brewing for the malt-diſtillery, but alſo in that more expeditious way, now in uſe with ſome, of reducing the operations of brewing and fermenting to one, and grinding the malt to a fine meal, which is to be kept in the waſh during the whole time, and even put into the ſtill with it, and worked together. The ſtirring may be repeated to great advantage more than once in each operation, as at the affuſion of every parcel of freſh water, in the common way, and at any ſhortly diſtant times in the ſhort way, in which it is of greater ſervice.

The action of fermentation works ſuch a change in the body of the tincture or ſolution, called the waſh, as to render it ſeparable by diſtillation, into parcels of matter that are ſpecifically different, and of a nature entirely foreign to what the ſame liquor would have yielded without the fermentation. See the article DISTILLATION.

WASHING, in painting, is when a deſign, drawn with a pen or crayon, has ſome

ſome one colour laid over it with a pencil, as Indian Ink, biſtre, or the like, to make it appear the more natural, by adding the ſhadow of prominences, apertures, &c. and by imitating the particular matters, whereof the thing is ſuppoſed to conſiſt.

Thus they waſh with a pale red to imitate brick and tile; with a pale indian blue, to imitate water and ſlate; with green, for trees and meadows; with ſaffron or french berries, for gold or braſs; and with ſeveral colours for marbles. Theſe waſhes are uſually given in equal teints or degrees throughout; which are afterwards brought down and ſoftened over the lights with fair water, and ſtrengthened with deeper colours for the ſhadows.

Some colours are of ſuch a gritty, ſandy nature, that it is impoſſible to grind them ſo fine as ſome curious works require; therefore, in order to get forth the flour and fineneſs of the colour, it muſt be waſhed, which is done thus: Take what quantity of colour you pleaſe to waſh, and put it into a veſſel of fair water; ſtir it about till the water be all coloured therewith, and if any filth ſwim on the top of the water, ſcum it clean off; and, when you think the groſſeſt of the colour is ſettled at the bottom, then pour off that water into another earthen veſſel, that is large enough to contain the firſt veſſel full of water four or five times; then pour more water into the firſt veſſel, and ſtir the colour that remains till the water be thick; and, after it is a little ſettled, pour the water alſo into the ſecond veſſel, and fill the firſt veſſel again with water, ſtirring it as before; continue to do this till you find all the fineſt of the colour drawn forth, and none but coarſe gritty ſtuff remain in the bottom; then let this water in the ſecond veſſel ſtand to ſettle till it is perfectly clear, and that all the colour be ſunk to the bottom; which when you perceive, then pour the water clear from it, and reſerve the colour in the bottom for uſe, which muſt be perfectly dried before you mix it with oil to work.

The colours thus ordered, are red led, blue and green bice, verditer, blue, green ſmalt, and ſpaniſh brown, when you would cleanſe it well from ſtones for ſome fine work, as alſo yellow oker, when you intend to make gold ſize of it.

WASHING *of ores*, the purifying an ore of any metal, by means of water, from earths and ſtones, which would otherwiſe render it difficult of fuſion; this operation Cramer orders to be done as follows: Break the ore to a coarſe powder in an iron mortar, weigh twenty or thirty docimaſtical centners of it, put them into the waſhing-trough, and pour ſome water upon them, that the ore may be thoroughly moiſt; then have a veſſel full of water, the diameter of which muſt be a little larger than the length of the trough; take the trough with the left-hand, by the top of the hinder part, and dipping it horizontally into the water, move it gently with the right-hand from the fore-part of the trough, which is always to be made the ſhallower part of it, toward the hinder part, which is deeper; then take out the trough, and incline it a little on the fore-part, that the water may run out, and the heavier metallic part remain at the bottom; repeat this ſeveral times till the remains at the bottom of the trough are quite pure. If the ſtone in which the ore is lodged be too hard for powdering in its natural ſtate, as the flinty and debaſed cryſtalline ones commonly are, the whole muſt be calcined, and quenched in cold water ſeveral times over, and afterwards powdered and waſhed in this manner: when it is thus waſhed, aſſay a centner of it, and from the bead of metal this yields, it will be eaſy to eſtimate the value of the ore.

WASHING, or WASHES, among goldſmiths, coiners, &c. are the lotions whereby they recover the particles of gold and ſilver out of the ſweep, *i. e.* aſhes, earths, ſweepings, &c.

This is either performed by ſimply waſhing them again and again, or by putting them in the waſhing-mill.

To make one of theſe waſhes, they not only gather together the aſhes of the furnaces, and ſweepings of the workhouſes, but they alſo break and pound the old earthen crucibles, and the very bricks whereof the furnaces are built; little particles of gold, &c. being found to ſtick to them by the crackling natural to thoſe metals, when in their laſt degree of heat.

Theſe matters, being ground and mixed together, are put in large wooden baſons, where they are waſhed in ſeveral waters, which run off by inclination into troughs underneath; carrying with them the earth, and the inſenſible particles of the

longitude from each other (See plate CCXCVII. fig. 1.) This plate makes an entire revolution in twenty-four hours; and, conſequently, every country thereon paſſes by the ſun, repreſented by A. Round this plate is a circle divided into 24 hours, alſo at reſt; by means of which, when the moveable plate is made to correſpond to the true time, ſhewn by the hands on the common ſide, the time of day or night, at the ſeveral countries ſpecified, is ſhewn by the hour-circle. Round the moveable plate, and between it and the circle of hours above deſcribed, moves a narrow circle, on which is engraved the moon's age; and over 29 ½ is placed an ivory-ball, B, repreſenting the moon: and at right-angles, each way, are placed two pins, C and D, one eaſtward, and the other weſtward; by means of which, the time of the moon's riſing, ſouthing and ſetting, at thoſe different places, is ſhewn in a very entertaining manner. Several other uſeful aſtronomical problems may alſo be ſolved thereby.

Striking WATCH, one which, beſides the common watch-work for meaſuring time, has a clock-part for ſtriking the hours; ſo that, properly ſpeaking, they are pocket-clocks. See CLOCK.

Repeating WATCH, one that by only pulling a ſtring, puſhing in a pin, *&c.* repeats the hour, quarter, or minute, at any time of the day or night.

WATCHING, or WAKEFULNESS, *inſomnia*, in medicine, is produced by too great a determination of the nervous fluid, to the organs of the ſenſes; whereby theſe organs are prepared to receive, readily, any impreſſions from external objects, which they propagate to the brain, and furniſh the ſoul with divers occaſions of thinking. This extraordinary flux of ſpirits may have two cauſes: for, 1. The ſenſible objects may ſtrike the organ with too much force. In which caſe, the animal ſpirits being violently agitated, and thoſe agitations continued by the nerves to the brain, they give a like motion to the brain itſelf; the neceſſary conſequence of which is, that the animal muſt wake. Thus, a loud ſhriek, pains, headach, gripes, coughing, *&c.* cauſe waking. And the ſoul's being oppreſſed with cares, or deeply engaged in thinking, contributes to the ſame, ſince, as it acts by the miniſtry of the ſpirits, any cares or meditations that keep them in motion, muſt produce watchfulneſs. Of this kind are thoſe inveterate wakings of melancholic perſons, ſome of whom have been known to paſs three or four weeks without a wink of ſleep. See SLEEP.

2. The other cauſe is in the ſpirits themſelves, which have ſome extraordinary diſpoſition to receive motion, or to perſiſt in it; as from their too great heat, or that of the brain, in fevers, *&c.* Hence it is, that the diſorder is moſt frequent in ſummer, in the heat of youth, *&c.* See HEAT.

Long faſting has the ſame effect; the want of food ſubtilizing the ſpirits, and drying the brain. The ſame is likewiſe an ordinary ſymptom in old age, by reaſon the pores of the brain and nerves having been much widened by the continual paſſage of ſpirits for a great number of years, the ſpirits now paſs and repaſs through them with too much eaſe, and need not any extraordinary motion to keep the mind awake.

There are inſtances of waking forty-five nights ſucceſſively; and we even read of a melancholy perſon, who never ſlept once in fourteen months. Such watchings uſually degenerate into madneſs.

When the cauſe is known, it muſt be removed, if poſſible, and the irritated ſpirits muſt be appeaſed with emulſions, eſpecially of poppy-ſeeds, or with the thebaic tincture, or theriaca, and other opiates in general, not neglecting the original diſeaſes. In fevers, a moiſt ſoftening diet is beneficial; as alſo preparations of barley, emulſions of poppy-ſeeds and almonds, decoctions of ſcorzonera-roots, almond cream, and winter-flummery uſed as aliment: likewiſe tea made of cowſlip-flowers, and gentle laxatives. When the patient is reſtleſs and wakeful the night before a criſis, no hypnotics ſhould be given. See FEVER.

When there is no other diſeaſe, the patient ſhould ſhun all care and intenſe thinking, eſpecially in the evening: he ſhould alſo uſe exerciſe, and eat light ſuppers. If it is cauſed by pains, they ſhould be appeaſed by antiſpaſmodics, things which temperate, and diaphoretics; and if theſe will not do, mild opiates muſt be added. In old perſons, all care and ſolitude muſt be baniſhed; the mind ſhould be quiet, and the moderate uſe of generous wine may be allowed in the evening; likewiſe medicines of amber and muſk will be proper, and con-

fectio

Fig. 1. Astronomical Watch.

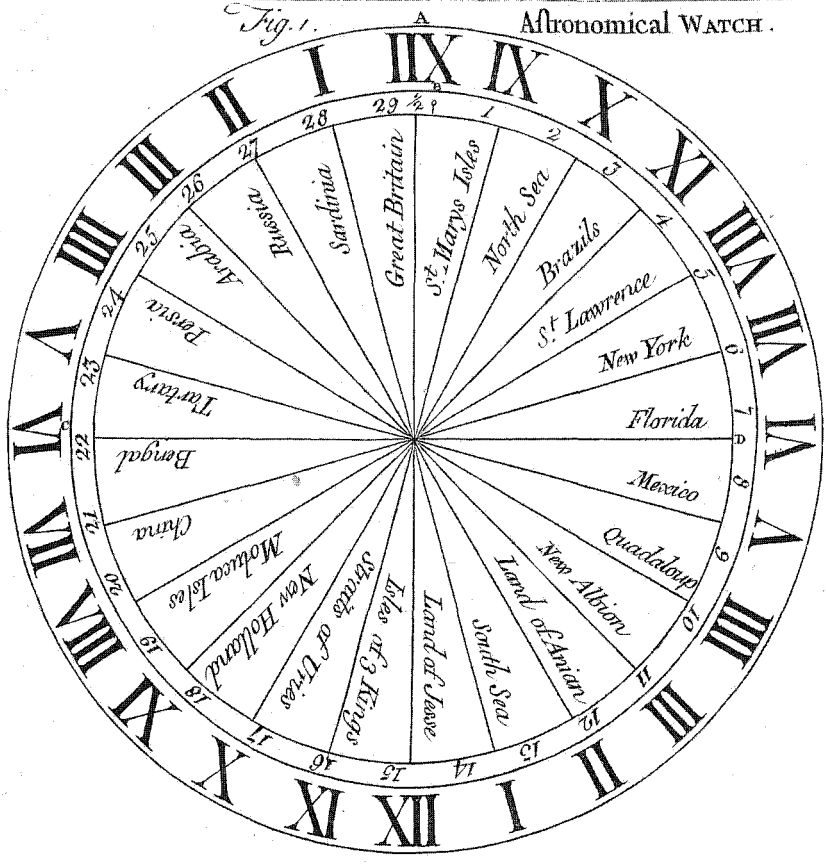


Fig. 2. Wave.

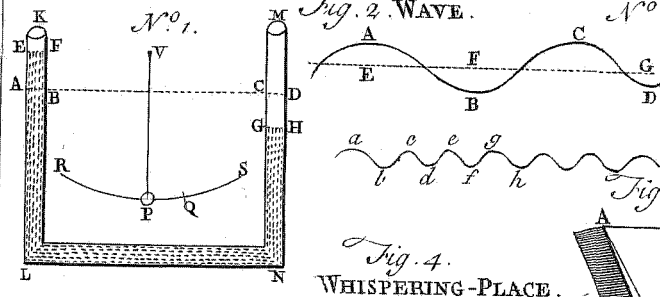


Fig. 3. Wedge.

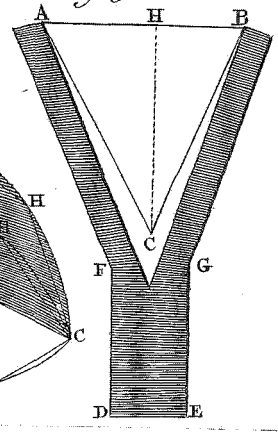


Fig. 4. Whispering-Place.

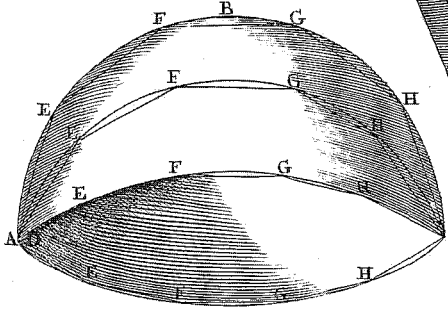
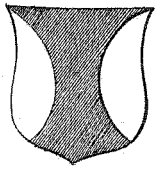


Fig. 5. Voider.



T. Jefferys sculp.

fectio alkermes or theriaca with wine. The drinking of hot water, and principally coffee, muſt be forbid after dinner.

WATER, *aqua*, in phyſiology, a ſimple, fluid, and liquid body, reputed the third of the four vulgar elements. Sir Iſaac Newton defines water to be a fluid ſalt, volatile and void of taſte; but this definition Boerhaave ſets aſide, in as much as water is a menſtruum or diſſolvent of ſalts and ſaline bodies, which does not agree with the notion of its being a ſalt itſelf; for we do not know of any ſalt that diſſolves another. This laſt mentioned philoſopher, therefore, defines water, a very fluid, ſcentleſs, taſteleſs, tranſparent, colourleſs liquor, which turns to ice with a certain degree of cold. See the article FLUID.

Though water be defined a fluid, it is a point controverted among philoſophers whether fluidity be its natural ſtate, or the effect of violence. We ſometimes find it appear in a fluid, and ſometimes in a ſolid form; and as the former, in our warmer climate, is the more uſual, we conclude it the proper one, and aſcribe the other to the extraneous action of cold. Boerhaave, however, aſſerts the contrary, and maintains water to be naturally of the cryſtalline kind; ſince wherever a certain degree of fire is wanting to keep it in fuſion, it readily grows into a hard glebe under the denomination of ice. Mr. Boyle is of the ſame opinion. Ice, he obſerves, is uſually ſaid to be water brought into a preternatural ſtate by cold; but with regard to the nature of things, and ſetting aſide our arbitrary ideas, it might as juſtly be ſaid that water is ice preternaturally thawed by heat. If it be urged, that ice left to itſelf will, upon the removal of the freezing agents, return to water; it may be anſwered, that, not to mention the ſnow and ice which lie all ſummer on the Alps, and other high mountains, even in the torrid zone, we have been aſſured, that in ſome parts of Siberia, the ſurface of the ground continues more months in the year frozen by the natural temperature of the climate, than thawed by the heat of the ſun; and a little below the ſurface of the ground, the water which chances to be lodged in the cavities there, continues in a ſtate of ice all the year round; ſo that when, in the heat of the ſummer, the fields are covered with corn, if you dig a foot or two deep, you ſhall find ice and a frozen ſoil. See the articles ICE, FREEZING, *&c.*

Water is generally divided into ſalt and freſh, with regard to the ocean and rivers. But, according to Dr. Shaw, it ſeems diviſible into as many different ſpecies, as the earth is into beds. Thus there are mineral waters of various kinds, according to the mineral ſubſtance they run over, and become impregnated with; tho' this impregnation ſometimes happens in the way of vapour and exhalation. Water, therefore, in the general, may be as mixed a body as earth, and perhaps neither of them naturally exiſts in any conſiderable purity. See SEA-WATER, MINERAL-WATER, EARTH, VAPOUR, EXHALATION, *&c.*

In a general analyſis of water, the doctor found, 1. That common warm water throws up numerous little bubbles, and explodes, in the exhauſted receiver of the air-pump; for which reaſon water contains what may, by way of diſtinction, be called æther or ſpirit. 2. It contains a merely aqueous part, diſtinct from æther and the ſediment, as appears from diſtilled common water. 3. It contains a dry ſolid matter, which is either earthy or ſaline, as appears upon a full evaporation, and from the inſides of tea kettles, which, after long uſe, are lined with a ſtony matter that beats off in flakes or cruſty pieces. See AIR, DISTILLATION, *&c.*

Water is not only contained in the earth as in a reſervoir, but likewiſe floats in the atmoſphere. In both caſes it is actuated, rarified, and put in motion by heat, ſo as to prove inſtrumental in producing effects. Thus it produces clouds, rains, dews, ſprings and rivers. It refreſhes the earth, recruits vegetables, and is the ſupport of fiſh and other animals by conveying nutriment to all their parts. It is alſo the firſt and immediate inſtrument of fermentation, putrefaction, corruption, and change in all vegetable and animal ſubjects. See ATMOSPHERE, CLOUD, RAIN, DEW, *&c.*

But the nature and uſes of water, will beſt appear from the following experiments. 1. That water is contained in many ſolid bodies, and to appearance in dry bodies, was proved thus: a piece of the hardeſt and drieſt bone being procured, and diſtilled in an earthen retort, with degrees of fire, a very large proportion water, along with much oil and volatile

volatile ſalt, was obtained: whence it appears, that animal matters are reſolvable into the four chemical principles, water, oil, ſalt and earth. This experiment holds true even of the oldeſt hartſhorn, the drieſt and hardeſt woods, earths and pulverized ſtones. Whence it alſo appears, that water may be concealed in ſolid bodies, and make a conſtituent part thereof: for it is not meant that water inſinuates itſelf into the ſuperficial pores of bodies, ſuch as wood, ſkins, &c. ſo as to ſwell them in moiſt weather, and leave them ſhrunk in dry; but that it remains permanently intermixed as an eſſential ingredient, or as a part of ſolid bodies. See BODY.

2. That water may be collected from the drieſt air, or in the hotteſt climate, was proved by the following experiment. Half a pint of common water was put into a cylindrical glaſs wiped perfectly dry on the outſide; then was added to the water two ounces and three quarters of pulverized and dry ſal ammoniac; theſe were ſtirred briſkly together, whereupon the water floating in the external air was, by the coldneſs thus produced, condenſed on the outſide of the glaſs as the ſalt diſſolved within, and trickled down in ſmall veins, into the ſhallow baſon ſet underneath to receive it. This experiment holds in all climates and places of different heights where it has been tried; whence by the law of induction we may make it univerſal, till any contradictory inſtance appears. Thus, therefore, it may hold in the moſt parched countries, and hotteſt ſeaſons, ſo as to afford an agreeable method of cooling potable liquors, and rendering them more refreſhing. For if the containing glaſs of the ſalt and water be ſet in any liquor, the liquor will be cooled thereby; and if any conſiderable improvement could be made in the contrivance, it is obſerved, that it might in ſome meaſure ſerve to ſupply the thirſty traveller in parched deſarts, and the ſailors with freſh water at ſea. See SEA-WATER.

3. To determine the proportion of water contained in an aſſigned portion of the atmoſphere, we are directed by the following experiment. Having by means of the air-pump, and an exact pair of ſcales, found the weight of a certain quantity of air contained in a large glaſs-veſſel, there was included therein a certain known weight of well dried potential cautery, whoſe property it is powerfully to attract the moiſture of the air. This veſſel was kept cloſe ſtopt for ſeveral hours; during which time, the potential cautery was grown wet, in which ſtate being weighed again, it was found conſiderably to increaſe; which muſt be either owing to the water attracted out of the air in the glaſs, or to a condenſation of the air itſelf into an aqueous fluid; for ſuch a fluid might now by diſtillation be obtained from the matter thus run per deliquium. It is obſerved that there is room to ſuſpect, that if this experiment were made in perfection, a weight of water almoſt equal to that of the air included in the veſſel, might be thus obtained, which might prove a very extraordinary diſcovery, and ſhew what ſome have endeavoured to prove, that the matter of common air, is little more than water. See AIR and ATMOSPHERE.

4. That an earthy ſubſtance is naturally contained in water, was proved as follows. Three ſeveral glaſſes were filled with pure rain water, ſpring water, and Thames water, and ſuffered to ſtand, cloſe covered, for ſome days before they were exhibited. There was an earthy ſediment then depoſited in all the three, but moſt in the Thames water, the ſediment whereof was not only larger, but alſo more foul and muddy than in the rain water; though here, alſo, it was dirty, perhaps, becauſe not carefully collected; whereas, in the pump-water, it was white, ſcaly, flaky, and ſhining, like fine ſpangles of talc. This experiment is alſo univerſal, ſo far as it has been tried with care, and holds true of the waters of all ſpecies, and all countries, particularly in thoſe called mineral waters, from which an earthy ſubſtance may uſually be precipitated by art, in a conſiderable proportion. See the article PYRMONT-WATER.

Certain experiments carefully made, and repeated, ſhew that the terreſtrial matter naturally contained in water, has a principal ſhare in the growth and increaſe of vegetables; all the plants that thrive in water appearing to enlarge their bulk in proportion to the earthy matter they draw from the water. Whence pure elementary water, ſeems but a kind of vehicle to convey this nutrimental or ſubſtantial part, and depoſite it in the veſſels through which the water moves, in order to its general exit at the ſurface of vegetables. But we are not here to exclude the inſtrumental efficacy of the two

other

other elements, fire and air. And this appearing to be the general office of water in the whole animal and vegetable kingdoms, *viz.* the conveyance or diſtribution of the alimentary matter to all their parts, it may be proper to conſider its phyſical properties, which would wonderfully fit it for this office. See the article VEGETATION.

The figure of its component parts appears to be ſmooth and ſpherical, like thoſe of quickſilver; whence it becomes extremely moving, and penetrating. Thus it readily enters the pores of wood, leather, ſkins, chords, muſical ſtrings, *&c.* thus likewiſe it becomes capable of moving and agitating particles of matter leſs active than itſelf, and ſo proves the more immediate phyſical agent of fermentation, putrefaction, ſolution, *&c.* and thus it alſo conveys earthy and ſaline matters through our filtres of paper, ſtone, *&c.* and even raiſes ſome proportion of them in diſtillations. Its particles likewiſe appear to be extremely minute, and ſo have a large ſhare of ſurface. Hence water is admirably fitted for a ſolvent, or for readily entering the pores of ſalts, and coming into full contact with all their particles; and thus it will paſs where air cannot, on account of its moiſture, or lubricating power, whereby it faſtens mucilaginous matters, and will therefore ſoak through the cloſe pores of a bladder.

The ſpecific gravity of water, and conſequently is goodneſs by its lightneſs, are to be directly judged of by the hydroſtatical ballance. This experiment is a good ſubſtitute for ſeveral other ways of examining the purity and goodneſs of waters, both common and mineral; for it appears by numerous inſtances, that light waters are, *cæteris paribus*, the beſt, pureſt, and wholeſomeſt. That water is accounted beſt and wholſomeſt which is not only the lighteſt and freeſt from earthy ſediment, but that which is the moſt ſpiritous; and theſe properties are uſually found in pure rain-water; that being naturally diſtilled from the ocean and rivers, or by the heat of the ſun raiſed up into the atmoſphere, from whence it is returned much after the manner of common diſtillation. See *Specific* GRAVITY, HYDROSTATICAL *Ballance*, CHALYBEATE *Water*, &c.

From the preceding, and other experiments of Dr. Shaw, made upon water, he deduces the following axioms and canons. Firſt we have ſeen, That water is naturally contained in ſome of the drieſt and hardeſt bodies, and in the drieſt air. 2. That itſelf naturally contains an earthy ſubſtance. 3. That it is the proper menſtruum of ſalts, diſſolving more of one, and leſs of another. 4. That one good ſign of its purity and wholeſomeneſs is levity. 5. That the ingredients of a mineral water may be diſcovered by chemical expedients: and, 6. That mineral waters are imitable by art from ſuch diſcovery. See MINERAL WATER, PYRMONT-WATER, *&c.*

Secondly, That water is of infinite uſe in all the works both of nature and art, as without it there could be no generation, nutrition, or accretion performed in any of the animal, vegetable, mineral, marine, or atmoſpherical regions. The blood could not flow in the veins, the ſap in the veſſels of vegetables, nor the particles of minerals concrete and grow together, without water. It is this that makes the largeſt part of our blood, our drink, and other aliments. There could be no corruption, fermentation, or diſſolution carried on without it, no brewing, no diſtilling, no wines, no vinegar, no ſpirits, made without it. See the article GENERATION, NUTRITION, ACCRETION, *&c.*

Thirdly, That we meet with water under an infinite variety of forms, and in an infinite variety of bodies, as that of air, vapour, clouds, ſnow, hail, ice, ſap, wines, blood, fleſh, bone, horn, ſtone, *&c.* through all which it ſeems to paſs unaltered, as an agent or inſtrument that ſuffers no alteration by re-action, but remains capable of reſuming the form of water again upon occaſion. See the article SNOW, HAIL, *&c.*

Fourthly, That water in its own common ſtate appears to be a combination of all the elements together, as containing a quantity of fire, which keeps it fluid, a quantity of air, and a quantity of earth; whence it can be no wonder that water alone, as it appears to the ſenſes, ſhould ſuffice for vegetation in ſome caſes, where little earth is wanted, or for ſupporting animal and mineral life, where no great degree of nutriment is required; and hence it proves a gluten, or cement to ſome bodies, and a ſolvent to others; thus it conſolidates brick, plaiſter of Paris, ſtone, bone, *&c.* but diſſolves

ſalts,

ſalts, and ſubtile earths approaching to ſalts, and becomes the inſtrumental cauſe of their action. See ELEMENT, &c.

Fifthly, That water conveys nouriſhment, or a more fixed and ſolid matter to the parts of vegetables, where having depoſited it, the finer fluid perſpires into the atmoſphere, which gives us the phyſical cauſe of the dampneſs and unwholeſomeneſs of woody countries, as they remarkably find in America. For all large vegetables act after the manner of forcing pumps, and continually draw in large quantities of water at their roots, and diſcharge it at their leaves, which intimates a method of collecting water in dry countries, and likewiſe of making ſalt-water freſh. See the article VEGETATION, SEA-WATER, &c.

Sixthly, That the water in paſſing thro' plants, after having depoſited its more terreſtrial part, does not always go off pure, but impregnated with the finer effluvia, or more ſubtile particles of the vegetable; thus making an atmoſphere round every plant, according to its nature odoriferous or otherwiſe, which ſupplies us with a rule for procuring the odoriferous waters of vegetables by diſtillation.

Seventhly, That the particles, not fine enough to go off thus along with the water, are left behind upon the ſurface of the leaves and flowers of plants, being now thickened or ſtrained from their moiſter parts, and remaining in the form of honey, manna, gums, balſams, &c. according to the nature of the vegetable. And hence appears the phyſical cauſe of plants proving more odoriferous and ſweet when the weather is both warm and moiſt, as immediately after a ſummer's ſhower. See the articles HONEY, MANNA, GUM, &c.

Eighthly, That the chemical operator ſhould form to himſelf an hygrometer for the ſervice of his laboratory to determine the proportion of water at all times contained in the air, which continually mixes with his preparations, differently augments their weight, and promotes or hinders many of his operations. See LABORATORY and HYGROMETER.

Ninthly, That pure water makes the largeſt part of mineral waters, where it is impregnated as a menſtruum, with ſeveral ingredients that it diſſolves or drinks up in its paſſage through the earth.

Tenthly and laſtly, The preceding enquiry affords conſiderable light for diſcovering practicable ways of making ſea water freſh and potable, and of preparing waters by art, ſo as to render them fitter for the common œconomical uſes, and the ſervice of many particular arts, as medicine, pharmacy, chemiſtry, brewing, diſtilling, &c.

Water is of the utmoſt uſe in divers of the mechanical arts and occaſions of life, as in the motion of mills, engines, fountains, and other machines, the conſtruction of all which, ſubſervient thereto, or founded thereon, as ſiphons, pumps, &c. make the ſubject of hydraulics. See the articles MILL, ENGINE, FOUNTAIN, MACHINE, HYDRAULICS, &c.

The laws, properties, &c. of this fluid, with reſpect to the foreſaid uſes, as its motion, gravitation, preſſion, elevation, action, momenta and velocities, &c. which make the ſubject of hydroſtatics, may be ſeen under the article FLUID and HYDROSTATICS.

For the water-poiſe, or that inſtrument which ſerves to meaſure the gravity, denſity, velocity, &c. of water, ſee the article HYDROMETER.

For the aſcent of water in capillary tubes, ſee the article CAPILLARY.

For an account of the water-clock, the water-level, the water-organ, &c. See CLEPSYDRA, LEVEL, ORGAN, &c.

WATER, in hydrography, and geography, is a common or general name, applied to all liquid tranſparent bodies, gliding or flowing on the earth, in which ſenſe water and earth are ſaid to conſtitute our terraqueous globe. See EARTH.

In this ſenſe, water is diſtinguiſhed with regard to the places where it is found, into ſea-water, rain-water, ſpring-water, well-water, ciſtern-water, lake-water, moraſs-water, &c. See the articles SEA, RAIN, RIVER, SPRING, WELL, &c.

For the periodical changes to which the water of the ſea is liable, ſee the articles TIDES, FLUX, EBB, &c.

WATER, in medicine, pharmacy, &c. called alſo, artificial and medicated waters, are a kind of liquors procured or prepared by art from divers bodies, principally of the vegetable tribe, having various properties, and ſerving for various purpoſes. Theſe waters are either ſimple, or compound; ſimple-waters are thoſe procured from ſome one vegetable body, the intention of which is to draw out the

virtues of the herb, ſeed, flower, root, or the like, ſo as it may be more conveniently given in that form than any other. The means whereby this ſeparation is effected, are either evaporation, infuſion, decoction, or diſtillation. See EVAPORATION, INFUSION, &c.

The ſimple-waters of chief virtue are the following ones, *viz.* dill-water, angelica-water, mint-water, roſemary-water, orange-flower-water, black-cherry-water, parſley-water, camomile-water, peny-royal-water, fennel-water, damaſk roſe-water, hyſſop-water, rue-water, juniper-water, elder-water, lovage-water, carminative-water, &c. for the virtues of each whereof we refer the reader to thoſe aſcribed to the ſeveral plants, or other bodies from whence the water is procured, which may be found under their proper heads in the courſe of this work.

Compound-waters, or thoſe wherein ſeveral ingredients are uſed, are very numerous, and make a large article in commerce; ſome prepared by the apothecaries, according to the diſpenſatory preſcripts, for medicinal uſes; others by the diſtillers, to be drank by way of dram; and others by the perfumers, &c. They are diſtinguiſhed by different epithets, &c. in reſpect either of the ſpecific virtues of the waters, or the parts of the body for the cure whereof they are intended, or the diſeaſes they are good againſt, or the ingredients they are compounded of, or their different uſes, &c.

The moſt conſiderable among the claſs of compound waters, are alexipharmic or alexiterial-waters, ſuch as treacle-water, plague-water, milk-water, poppy-water, &c. alum-water, angelica-water, anniſeed-water, apricot-water, aromatic-water, arthritic water, bryony-water, carduus-water, water of ſeparation, or depart, cauſtic-water, cephalic-water, chalybeat-water, cinnamon-water, clary-water, clove-water, cordial-water, coſmetic-water, gentian-water, gum-water, hepatic-water, honey-water, hungary-water, hyſteric-water, iced or frozen-water, imperial-water, lime-water, aqua-mirabilis, or the wonderful-water, nephritic-water, ophthalmic water, orange-water, peach-water, poppy-water, pyony-water, roſe-water, ſcordium-water, ſpecific-water, ſplenetic-water, ſtomachic-water, ſtyptic-water, treacle-water, vulnerary-water, &c.

The uſes and preparations of moſt of theſe, and ſeveral others, may be ſeen as they are arranged under their reſpective names throughout the courſe of this work; but as theſe waters are exceeding numerous, and the manner of making them, is not always the ſame, we muſt refer the chemical or medical reader to the diſpenſatories, wherein he will find, that every one gives his own method as the beſt one.

We have only three general remarks to add, with regard to thoſe intended for drinking. 1. That ſuch wherein any thing is infuſed, as bruiſed fruits, pounded herbs, &c. or ground ſpices, muſt be always paſſed through a filtre, to make them finer and purer. 2. That thoſe made with brandy, or ſpirit of wine, are uſually diſtilled after mixing their ingredients, which renders thoſe liquors exceeding ſtrong and dangerous. 3. That the waters which take their name from particular things, as cinnamon, &c. have often ſome other ingredients, joined with them, according to the taſte or ſmell required.

WATER, in anatomy, is applied to divers liquors or humours in the human body, ſuch is the aqua phlegmatica, which is a ſoft ſerous humour, contained in the pericardium, and wherein the heart ſwims. See PERICARDIUM.

Holy WATER, a water prepared every Sunday in the romiſh church, with divers prayers, exorciſms, &c. uſed by the people to croſs themſelves withal at their entrance to and going out of, church; and pretended to have the virtue of waſhing away venial ſins, driving away devils, preſerving from thunder, diſſolving charms, ſecuring from, or curing diſeaſes, &c. Many of the reformed take the uſe of holy-water to have been borrowed from the luſtral water of the antient Romans. See LUSTRATION.

WATER ORDEAL, or TRIAL, among our anceſtors, was of two kinds, by hot, and by cold, water. Trial or purgation, by boiling or hot water, was a way of proving crimes, by immerging the body, or the arm, in hot water, with divers religious ceremonies. In the judgment by boiling water, the accuſed, or he who perſonated the accuſed, was obliged to put his naked arm into a caldron full of boiling water, and to draw out a ſtone thence placed at a greater or leſs depth, according to the quality of the crime. This done, the arm was wrapped up, and the judge ſet his ſeal on the cloth, and at the end of three days they return-

ed to view it, when if it were found without any ſcald, the accuſed was declared innocent. The nobles or great perſonages purged themſelves thus, by hot water, and the populace, by cold water. The trial, or purgation, by cold water, was thus: after certain prayers and other ceremonies, the accuſed was ſwaddled, or tied up, all in a pelotoon or lump, and thus caſt into a river, lake, or veſſel, of cold water, where if he ſunk he was held criminal, if he floated, innocent.

In the levitical law, we find mention made of water which ſerved to prove, whether or no a woman was an adultereſs; the formula, as it was perſormed by the prieſt, may be ſeen in the fifth chapter of the book of Numbers.

WATER, among jewelers, is properly the colour or luſtre of diamonds and pearls. The term, though leſs properly, is ſometimes uſed for the hue or colour of other ſtones. See DIAMOND and PEARL.

WATER-BAILIFF, is an officer in ſea-port towns, appointed for the ſearching of ſhips; and in London, the water-bailiff hath the ſuperviſing and ſearch of fiſh, brought thither; and the gathering of the toll ariſing from the Thames; his office is likewiſe to arreſt men for debt, *&c.* or other perſonal or criminal matters upon the river Thames.

WATER BORNE, in the ſea-language. A ſhip is ſaid to be water-borne, when ſhe is, where there is no more water than will barely bear her from the ground; or when lying even with the ground, ſhe firſt begins to float or ſwim.

WATER-COLOURS, in painting, are ſuch colours as are only diluted and mixed up with gum-water, in contradiſtinction to oil-colours.

The uſe of water-colours makes what we call limning, as that of oil-colours does painting, properly ſo called. See the articles COLOUR and LIMNING.

Dead-WATER, in the ſea-language, is the eddy-water that follows the ſtern of a ſhip, not paſſing away ſo faſt as that which ſlides by her ſides.

WATER, or SEA-GAGE. See *GAGE*.

WATER-GANG, a channel cut to drain a place by carrying off a ſtream of water.

WATER-LINE *of a ſhip*, a line which diſtinguiſhes that part of her under water from that above, when ſhe is duly laden.

WATER-MEASURE. Salt, ſea-coal, *&c.* while aboard veſſels in the pool or river, are meaſured with the corn-buſhel heaped up; or elſe five ſtriked pecks are allowed to the buſhel. This is called water-meaſure. See the article MEASURE.

WATER-MEN, as ſuch as row in boats, or ply on the river Thames, in the government of whom the lord-mayor of London, and court of aldermen there, had always great power. They ſtill have the appointing of their fares, the taking more than which, makes them liable to a fine of 40s. and half a year's impriſonment. The fares aſſeſſed are, from London-bridge to Limehouſe, Ratcliff-croſs, *&c.* oars, 1s. ſcullers, 6d. to Wapping-dock, Rotherhith-church-ſtairs, *&c.* oars, 6d. ſcullers 3d. from either ſide of the water above the Bridge to Lambeth, and Vaux-hall, oars, 1s. ſcullers, 6d. all the ſtairs between London-bridge and Weſtminſter, oars, 6d. ſcullers, 3d. Watermens boats ought to be twelve feet and a half in length, andfour and a half in breadth; and no apprentice to any waterman ſhall take upon him the care of a boat till he is ſixteen years of age, if a waterman's ſon; and ſeventeen, if a landman's ſon, unleſs he has worked with ſome able waterman two years, *&c.* No tilt-boat, or row barge, *&c.* may take in above thirty-ſeven paſſengers, or three more by the way; nor any boat above eight paſſengers, and two by the way, elſe they forfeit 5l. for the firſt offence, and 10l. for the ſecond, *&c.* and if any perſon be drowned when a greater number are taken in, the waterman is declared guilty of felony, and may be tranſported, *&c.*

WATER-SHOOT, a young ſprig which ſprings out of the root or ſtock of a tree.

WATER-SHOT, in the ſea-language, a ſort of riding at anchor when a ſhip is moored neither croſs the tide, nor right up and down; but quartering betwixt both.

WATER-TABLE, in architecture, a ſort of ledge left in ſtone, or brick walls, about eighteen or twenty inches from the ground, from which place the thickneſs of the wall begins to abate. See WALL.

WATER-WAY, in a ſhip, is a ſmall ledge of timber, lying fore and aft on the deck, cloſe by her ſides, to keep the water from running down there.

WATER-WHEEL, an engine for raiſing water in great quantity out of a deep well. See *Perſian* WHEEL.

WATER-WORKS, in general, denote all manner of machines moved by, or employed in raiſing or ſuſtaining water; in which ſenſe, water-mills of all kinds, ſluices,

London-Bridge WATER-WORKS

T. Jeffreys sculp.

ſluices, aquæducts, &c. may be called water-works. See MILL, &c.

The term water-works, however, is more particularly uſed for ſuch machines as are employed only in raiſing water.

We ſhall begin with the deſcription of that at London-bridge, which is moved by the common tide-water of the river Thames. A B (plate CCXCVIII.) the axle-tree of the water-wheel, is nineteen, feet long, three feet diameter, in which C, D, E, F, are four ſets of arms, eight in each place, on which are fixed G, G, G, G, four rings, or ſets of felloes, in diameter twenty feet; and the floats H, H, H, fourteen feet long, and eighteen inches deep, being about twenty-ſix in number.

The wheel lies with its two gudgeons, or center-pins A B, upon two braſſes in the pieces M N, which are two great levers, whoſe fulcrum, or prop, is an arched piece of timber L; the levers being made circular on their lower ſides to an arch of the radius M O, and kept in their places by two arching ſtuds fixed in the ſtock L, through two mortiſes in the lever M N. The wheel is, by theſe levers, made to riſe and fall with the tide, which is performed in this manner: the levers M N are ſixteen feet long; from M, the fulcrum of the lever, to O the gudgeon of the water-wheel, ſix feet; and from O to the arch at N, ten feet. To the bottom of the arch N is fixed a ſtrong triple chain P, made after the faſhion of a watch-chain, but the links arched to a circle of one foot diameter, having notches, or teeth, to take hold of the leaves of a pinion of caſt iron Q, ten inches diameter, with eight teeth in it moving on an axis. The other looſe end of this chain has a large weight hanging at it, to help to counterpoiſe the wheel, and preſerve the chain from ſliding on the pinion. On the ſame axis is fixed a cog-wheel R, 6 feet diameter, with 48 cogs. To this is applied a trundle, or pinion S, of ſix rounds, or teeth; and upon the ſame axis is fixed T, a cog-wheel of fifty-one cogs, into which the trundle V, of ſix rounds, works; on whoſe axis is a winch or windlaſs W, by which one man, with the two windlaſſes, raiſes or lets down the wheel, as there is occaſion. And becauſe the fulcrums of theſe levers M N are in the axis of the trundle K, *viz.* at M or X, in what ſituation ſoever the wheel is raiſed or let down, the cog-wheel I, I, is always equidiſtant from M, and works or geers truly.

By means of this machine the ſtrength of an ordinary man will raiſe about fifty ton weight.

I, I, is a cog-wheel fixed near the end of the great axis, eight feet diameter, and 44 cogs working into a trundle K, of $4\frac{1}{2}$ feet diameter, and 20 rounds, whoſe axis or ſpindle is of caſt iron 4 inches in diameter, lying in braſſes at each end, as at X.

Z Z is a quadruple crank of caſt iron, the metal being ſix inches ſquare, each of the necks being turned one foot from the center, which is fixed in braſſes at each end in two head-ſtocks faſtened down by caps. One end of this crank at Y is placed cloſe abutting to the end of the axle-tree X, where they are at thoſe ends ſix inches diameter, each having a ſlit in the ends, where an iron wedge is put, one half into the end X, the other half into Y, by means of which the axis X turns about the crank Z Z.

The four necks of the crank have each an iron ſpear, or rod, fixed at their upper ends to the reſpective libra, or lever, *a* 1, 2, 3, 4, within three feet of the end. Theſe levers are twenty-four feet long, moving on centers in the frame *b b b b*; at the end of which, at *c* 1, 2, 3, 4, are jointed four rods with their forcing plugs working into *d* 1, 2, 3, 4, four caſt iron cylinders four feet three quarters long, ſeven inches bore above, and nine below where the valves lie, faſtened by ſcrewed flanches over the four holes of a hollow trunk of caſt iron, having four valves in it juſt over *e e e e*, at the joining on at the bottom of the barrels, or cylinders, and at one end a ſucking pipe or grate *f*, going into the water, which ſupplies all the four cylinders alternately.

From the lower part of the cylinders *d* 1, *d* 2, *d* 3, *d* 4, come out necks turning upward arch-wiſe, as *g g g g*, whoſe upper parts are caſt with flanches to ſcrew up to the trunk *h h h h*; which necks have bores of ſeven inches diameter, and holes in the trunk above communicating with them, at which joining are placed four valves. The trunk is caſt with four boſſes, or protuberances, ſtanding out againſt the valves to give room for their opening and ſhutting; and on the upper ſide are four holes ſtopped with plugs, to take out on occaſion, to clean

the valves. One end of this trunk is ſtopped by a plug *i*. To the other iron pipes are joined, as *i* 2, by flanches, through which the water is forced up to any height or place required.

Beſides theſe four forces, there are four more placed at the other ends of the libræ, or levers (not ſhewn here to avoid confuſion, but to be ſeen on the left hand) the rods being fixed at *a* 1, 2, 3, 4, working in four cylinders, with their parts *d d*, &c. *e e*, *f*, *g g*, and *i*, as before deſcribed, ſtanding near *k k*.

At the other end of the wheel (at B) is placed all the ſame ſort of work as at the end A is deſcribed, *viz.*

The cog-wheel I.
The trundle K.
The ſpindle X.
The crank Y, Z.
The ſucking pipes *f*.
The four levers *ac*, *ac*, *&c.*
Eight forcing rods, *ad*, *ad*, *&c.*
Eight cylinders, *de*, *de*, *&c.*
Four trunks, ſuch as *ee*, *bb*.
Two forcing pipes, as *i*.
So that one ſingle wheel works 16 pumps.
All which work could not be drawn in one perſpective view, without making it very much confuſed.

A calculation of the quantity of water raiſed by the engines at London bridge.

In the firſt arch next the city is one wheel with double work of 16 forcers.

In the third arch { First wheel double work at one end, and ſingle at the other 12
Second wheel in the middle 8
Third wheel 16

In all 52 forcers.

One revolution of a wheel makes in every forcer $2\frac{1}{5}$ ſtrokes.

So that one turn of the four wheels makes 114 ſtrokes.

When the river is at beſt, the wheels go ſix times round in a minute, and but $4\frac{1}{2}$ at middle water } 6

The number of ſtrokes in a minute 684

The ſtroke is $2\frac{1}{2}$ feet in a 7 inch bore, raiſes 3

They raiſe per minute 2052 } ale gallons.

That is, 123120 gallons = 1954 hogſheads per hour, and at the rate of 46896 hogſheads in a day, to the height of 120 feet.

This is the utmoſt quantity they can raiſe, ſuppoſing there were no imperfections or loſs at all.

But it is certain, from the conſiderations following, that no engine can raiſe ſo much as will anſwer the quantity of water the cylinder contains in the length of the forces, or piſton's motion. For,

Firſt, opening and ſhutting of the valves loſe nearly ſo much of that column, as the height they riſe and fall.

Secondly, no leather is ſtrong enough for the piſton, but there muſt continually ſlip, or ſqueeze by, ſome water, when it is raiſed to a great height; and, when the column is ſhort, it will not preſs the leather enough to the cylinder, or barrel: but, eſpecially at the beginning or firſt moving of the piſton, there is ſo little weight on it, that, before the leather can expand, there is ſome loſs.

Thirdly, and this loſs is more or leſs, as the piſtons are looſer or ſtraiter leathered.

Fourthly, when the leathers grow too ſoft, they are not capable of ſuſtaining the pillar to be raiſed.

Fifthly, if they are leathered very tight, ſo as to loſe no water, then a great part of the engine's force is deſtroyed by friction.

By ſome experiments accurately made on engines, whoſe parts are large and excellently performed, they will loſe one fifth and ſometimes one fourth of the calculated quantity.

However, the perfections or errors of engines are to be compared together, by the calculated quantities or forces; for as they differ in thoſe, they will proportionably differ in their actual performances.

The power by which the wheels are moved.

The weight of the pillar of water on a forcer 7 inches diameter and 120 feet high.

$7 \times 7 = 49$ lb. The pounds avoirdupoiſe in a yard, nearly.

40 yards high.

1960 lb. on one forcer.

8 forcers always lifting.

The whole weight 15680 lb. = 140 Cwt. = 7 ton weight on the engine at once.

WATER-WORKS.

Fig. 1.

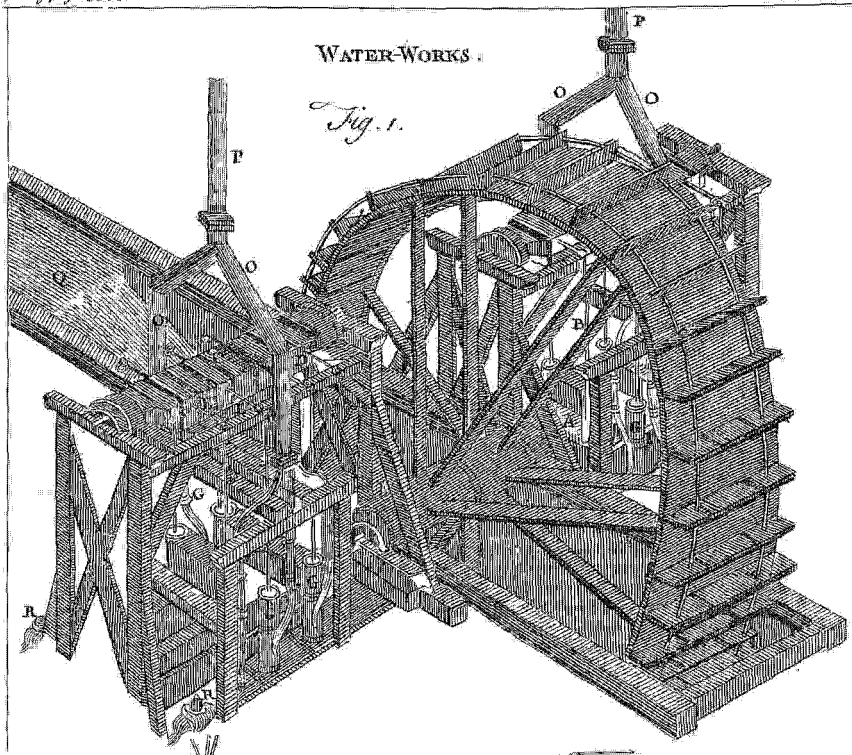


Fig. 3.

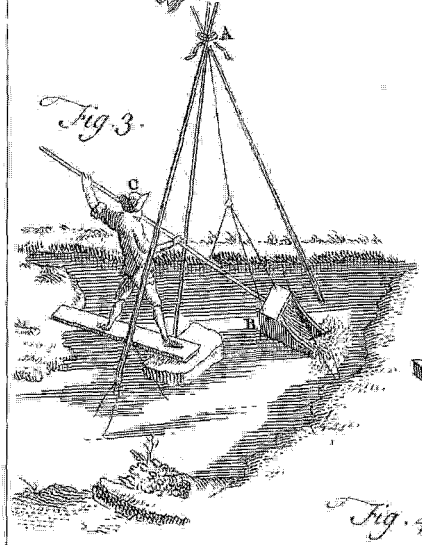


Fig. 2.

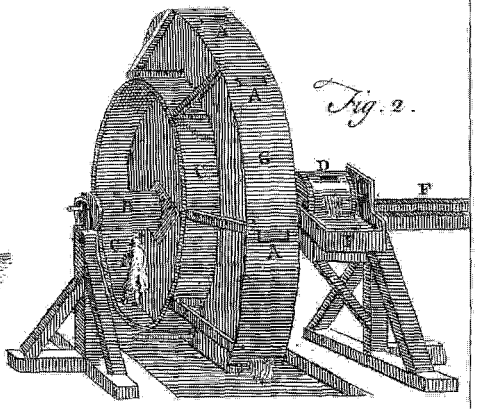
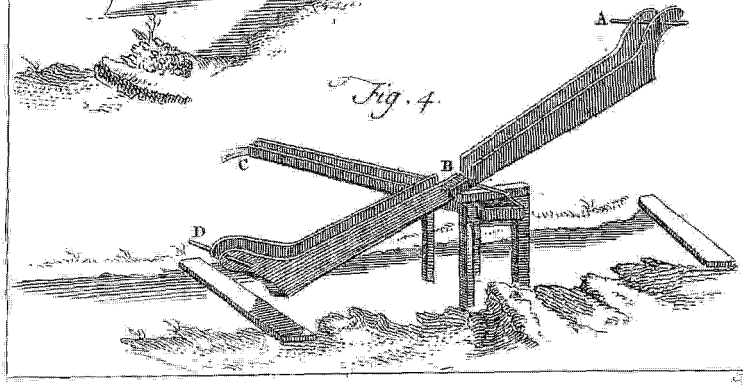


Fig. 4.



Then the crank pulls the libra 3 feet from the forcer, and 8,3 feet from the center,

7 ton
×11.3
8,3)79.1(9,5. ton on the crank.

Wallower - 2,2)9,5(4,3 ton on trundle.
The ſpur-wheel - 4
Radius of the great wheel 10)17,2(1,72 ton.
20
34,40 Cwt.

The force on the floats 18 Cwt. 40 lb.
But to allow for friction and velocity, may be reckoned 1 ton ½.
The ladles, or paddles, 14 feet long, 18 inches deep, = 22,4 ſquare feet.
The fall of water is at a mean - 2 feet.
44,8
6 gallons in a cubic foot.
268,8
10, lb. in a gallon.
112) 2688 (24 hundred.

The velocity of the water, 4 feet in 21″ of time.
21″ — 4 feet :: — 60″ : = 685 feet *per* minute.
The velocity of the wheel = 310 feet *per* minute.
Quantity expended on the wheel, according to the velocity of the ſtream, 1433 hogſheads *per* ſecond.
But at the velocity of the wheel 645 hogſheads *per* ſecond.
The velocity of the wheel to the velocity of the water, as 1 to 2, 2.

Fig. 1. plate CCXCIX. repreſents a curious machine for raiſing water, executed at Nynphenbourg, by the count de Whal, maſter of the works to the elector of Bavaria. It raiſes water ſixty feet high into a reſervoir, for the uſe of the elector's gardens.

The water of the canal, falling down the inclined plane at Q, turns the large wheel repreſented in the figure, the circumference of which, by cogs, moves the arbor D, and the ſame on the other ſide; to thoſe are faſtened the piſtons of ſixteen forcing pumps G, four on each ſide the arbor, as repreſented in the figure.

From each of theſe pumps is a tube, through which the water is forced into the pipe O, and from thence through the pipe P, which conveys it into the reſervoir. Theſe pumps are faſtened together by pieces of timber, with iron clamps, to make them firm, as may be ſeen in the figure.

This is a very good machine, and deſerves to be imitated, either in whole or in part, when water is to be raiſed.

We ſhall conclude this account of waterworks with a deſcription of two machines much uſed in Holland.

Fig. 2. *ibid.* repreſents another machine for raiſing water: it is moved by the man C, walking in the wheel C, as is plain from the figure. The large wheel A, A, G, has ſeven ſquare holes in its circumference, as A, A, A, which run in a ſpiral form to the axis B. The water, by the motion of the wheel whoſe circumference is conſtantly immerſed in it, runs along theſe ſpiral tubes to the axis; from whence it is conveyed to D, where it is diſcharged, and by means of the trough and ſpout F, F, conveyed to the reſervoir deſtined to receive it.

Fig. 3. *ibid.* repreſents a machine uſed by the Dutch for freeing their dykes of water. It conſiſts of five pieces of board, forming a kind of ſcoop, as B; the handle C is ſuſpended by a rope faſtened to three poles placed triangularly, and faſtened together at A, as is plain from the figure. As the working of this machine conſiſts in balancing it, and directing it ſo that, after having filled it with water, it may throw it on the other ſide of the dam, we ſhall only obſerve that the labourer at two ſtrokes can draw only half a cubic foot of water in four ſeconds, which amounts to four hundred cubic feet in an hour.

Fig. 4. *ibid.* is another machine of the ſame kind with that above deſcribed. The figure ſufficiently explains its uſe. It is worked by two men, one at A, and another at D. The machine moves on the center B, and each end is immerſed alternately in the water; by which means it flows into each end of the machine, where

where there is a valve, to prevent its returning; and, by the alternate motion of the machine, the water ſo taken up is conveyed to B, and from thence, by the ſpout C, over the dam.

WATERFORD, a port-town of Ireland, capital of the county of Waterford, ſituated on the river Sure, eight miles north of the ſea: weſt long. 7°, north lat. 52° 12′.

It is one of the largeſt cities in Ireland, and has a good foreign trade.

WATERING, in the manufactures, is to give a luſtre to ſtuffs, &c. by wetting them lightly with gum-water, and then paſſing them through the preſs, or calender, whether hot or cold.

The gum-water ought to be pure, thin, and clear, otherwiſe the folds of the ſtuff will ſtick together: the operation muſt alſo be performed when the water is very hot, that it may penetrate.

WATLINGTON, a market-town of Oxfordſhire, ſituated twelve miles ſouth-eaſt of Oxford.

WATTON, a market town of Norfolk, ſixteen miles ſouth-weſt of Norwich.

WAVE, *unda*, in philoſophy, a cavity in the ſurface of water, or other fluid, with an elevation aſide thereof. See the article FLUID.

Sir Iſaac Newton explains the nature of waves in water after the following manner: Let AB and CD (*pl.* CCXCVII. fig. 2. n° 1.) be the ſurface of water quieſcent in the upright leg KL, MN, of a received tube. And if the water be put into motion, and aſcends in the leg KL to EF, it will deſcend in the leg MN to GH; ſo that EA = DH. Again, let PV be a pendulum vibrating in the cycloid RPS, its length VP, from the point of ſuſpenſion to the center of oſcillation, is equal to half the length of the water in the tube; let P be the loweſt point, and PQ an arch of the cycloid, equal to the altitude AE.

The force by which the water is alternately accelerated and retarded in its motion in the tube, is the exceſs of the weight of water in either leg above the weight in the other; and, therefore, when the water in the leg KL aſcends to EF, and in the other leg deſcends to GH, that force is equal to the weight of the two equal quantities of water AEFB + CGHD = 2AEFB; and, therefore, is to the weight of the whole water, as EA to VP, or as PQ to PR; becauſe the ſemi-cycloid PR is equal to the length of the pendulum which deſcribes it, from the nature of the curve.

All the power by which the weight P is in any point Q accelerated or retarded in the cycloid, is, to its whole weight, as the diſtance PQ from the loweſt point P, to the length of the ſemi-cycloid PR. Wherefore, as the moving forces of the water and pendulum are at firſt quieſcent, thoſe powers will move them equally in equal times, and cauſe that they go forwards and backwards together with a reciprocal motion: all which is eaſily deduced from what has been ſaid of the nature of the cycloid, the motion of heavy bodies, and the forces of bodies in motion.

Hence it follows, that, whether the diſtance AE be great or ſmall, the reciprocations of the water will all be performed in equal times. Alſo, it follows, that if the whole length of the water be 78,4 inches, each reciprocation, or aſcent and deſcent of the water, will be performed in one ſecond of time; becauſe a pendulum of half that length vibrates in that time. Laſtly, if the length of the aqueous canal be increaſed or diminiſhed, the time of each reciprocation will be increaſed or diminiſhed in the ſubduplicate ratio of the length.

When the nature of waves in water is conſidered, it will be found to agree very nearly with the motion of the water in the tube abovementioned; and, conſequently, their motion will be ſimilar to that of a pendulum. For let EFG (*ibid.* n° 2.) repreſent the level ſurface of water when it is not agitated ſo as to produce waves; when it is thus agitated, let ABCD repreſent the wavy ſurface, AC the higheſt parts of the waves, and BD the loweſt or concave part. Then it is evident, the weight of the water at A above EG will cauſe it to deſcend as far below the level to B; and with the motion acquired by that deſcent, it will again aſcend to the ſame height C, and ſo produce a conſtant ſucceſſion of waves in the watery ſurface, after the ſame manner as was ſhewn in the tube.

Hence it follows, that becauſe the length of the whole water to be moved is from the higheſt point A to the loweſt point B, if the length of a pendulum be half AB, it will oſcillate once while the water deſcends from A to B; and in another oſcillation, it will aſcend from B to C; and ſo on. So that a wave will paſs

through

through its whole length in the time of two oſcillations; and, therefore, in the time of one oſcillations of a pendulum four times as long, or equal to ABC.

Whence, becauſe ABC, in very large and wide waves, is nearly equal to the breadth AC; therefore, when the waves are 39,2 inches broad, they will undulate in one ſecond of time; and, conſequently, ſince the times of all the undulations are equal, there will be $39,2 + 60 = 2352$ inches, or 196 feet, run through by a wave in one minute; which is 11760 feet *per* hour. Hence, alſo, the velocity of greater or leſſer waves will be increaſed or diminiſhed in the ſubduplicate proportion of their breadth: that is, if V = velocity of the greater waves ABCD, and v = velocity of the leſſer waves *a. b. c. d. e. f.* &c then it will be $V : v :: \sqrt{AC} : \sqrt{ac}$. Becauſe the velocities and times of bodies, moved in any manner by gravity, are proportional to the ſquare roots of the perpendicular altitudes, and thoſe altitudes are as the lengths of pendulums; and, therefore, as the breadth of waves.

The waves of the ſea are of two kinds, natural and accidental. The natural waves are thoſe which are exactly proportioned in ſize to the ſtrength of the wind, whoſe blowing gives origin to them. The accidental waves are thoſe occaſioned by the wind's reacting upon itſelf by repercuſſion from hills and mountains, or high ſhores, and by the waſhing of the waves themſelves, otherwiſe of the natural kind, againſt rocks and ſhoals: all theſe caſes give the waves an elevation, which they can never have in their natural ſtate.

Mr. Boyle has proved, by numerous experiments, that the moſt violent wind never penetrates deeper than ſix feet into the water; and it ſhould ſeem a natural conſequence of this, that the water moved by it can only be elevated to the ſame height of ſix feet from the level of the ſurface in a calm: and this ſix feet of elevation being added to the ſix of excavation, in the part whence that water ſo elevated was raiſed, ſhould give twelve feet for the utmoſt elevation of a wave. This is a calculation that does great honour to its author; for count Marſigli meaſured carefully the elevation of the waves near Provence, and found that, in a very violent tempeſt, they aroſe only to ſeven feet above the natural level of the ſea, and this additional foot in height he eaſily reſolved into the accidental ſhocks of the water againſt the bottom, which was, in the place he meaſured them in, not ſo deep as to be out of the way of affecting the waves; and he allows that the addition of one ſixth of the height of a wave, from ſuch a diſturbance from the bottom, is a very moderate alteration from what would have been its height in a deep ſea; and concludes, that Mr. Boyle's calculation holds perfectly right in deep ſeas, where the waves are purely natural, and have no accidental cauſes to render them larger than their juſt proportion. In deep water, under the high ſhores of the ſame part of France, this author found the natural elevation of the waves to be only five feet; but he found alſo, that their breaking againſt rocks, and other accidents to which they were liable in this place, often raiſed them to eight feet high.

We are not to ſuppoſe, from this calculation, that no wave of the ſea can riſe more than ſix feet above its natural level in open and deep water; for waves immenſely higher than theſe are formed, in violent tempeſts, in the great ſeas. Theſe, however, are not to be accounted waves in their natural ſtate, but they are ſingle waves formed of many others; for in theſe wide plains of water, when one wave is raiſed by the wind, and would elevate itſelf up to the exact height of ſix feet, and no more, the motion of the water is ſo great, and the ſucceſſion of the waves ſo quick, that, during the time this is riſing, it receives into it ſeveral other waves, each of which would have been at the ſame height with itſelf; theſe run into the firſt wave, one after another, as it is riſing: by this means its riſe is continued much longer than it naturally would have been, and it becomes terribly great. A number of theſe complex waves ariſing together, and being continued in a long ſucceſſion by the continuation of the ſtorm, make the waves ſo dangerous to ſhips, which the ſailors in their phraſe call mountains high.

WAVE-OFFERING, in jewiſh antiquity, a ſacrifice offered by agitation, or waving, towards the four cardinal points of the compaſs. See the article SACRIFICE.

WAVED, WAVY, or WAVEY, in heraldry, is ſaid of a bordure, or any ordinary, or charge, in a coat of arms, having its out-lines indented, in manner of the riſing and falling of waves: it is uſed

uſed to denote, that the firſt of the family in whoſe arms it ſtands, acquired its honours for ſea-ſervice.

WAVING, in the ſea-language, is the making ſigns to a veſſel to come near or keep off.

WAVREN, or GAVEREN. See the article GAVEREN.

WAX, or *Bees*-WAX, in natural-hiſtory, a firm and ſolid ſubſtance, moderately heavy, and of a fine yellow colour, formed by the bees from the farina of flowers, which they work up and compreſs into a maſs, or ſort of cake, and of which they form their honey-combs; from whence it is obtained by heating and ſtraining them through a linnen cloth, or by preſſing them betwixt iron-plates, *&c.* The beſt ſort is that of a lively yellow colour, and an agreeable ſmell, ſomewhat like that of honey: when new it is toughiſh, yet eaſy to break; but by age it becomes harder and more brittle, loſes its fine colour, and in a great meaſure its ſmell. See the article HONEY-COMB.

From the common yellow wax, by the mere effect of ſun and air, or by what is called bleeching, is formed what we term white-wax, and ſome, very improperly, virgin-wax. As the greater the ſurface is in proportion to the quantity, the ſooner and more perfectly this operation is perſormed. The uſual way is to melt the wax in hot water; when melted, they preſs it through a ſtrainer of tolerably fine linen, and pour it into round and very ſhallow moulds. When hardened by cooling, it is taken out and expoſed to the ſun and air, ſprinkling it now and then with water, and often turning it: by this means it ſoon becomes white. The beſt ſort is of a clear and almoſt tranſparent whiteneſs, dry, hard, brittle, and of an agreeable ſmell, like that of the yellow wax, but much weaker.

The common yellow wax is of very great uſe both in medicine and in many of the arts and manufactures. It is ſometimes given internally, as in dyſenteries, and other eroſions of the inteſtines; but its great uſe is in the making ointments and plaſters for external uſe, and the greater part of thoſe of the ſhops owe their conſiſtence to it. The white wax is alſo an ingredient in ſome of the cerates and ointments of the ſhops; and is uſed in making candles, and in many of the nicer arts and manufactures, where wax is required.

Bees-wax, on being imported, pays a duty of 9 s. $6\frac{9}{100}$ d. the hundred weight, and draws back, on exportation, 8 s. $7\frac{1}{2}$ d.

Preparations of WAX. The butter and oil of wax are thus prepared: Cut the wax in pieces and put them into a retort, which muſt be half filled with theſe pieces; and the reſt of the retort being filled with ſand, it muſt be placed in a ſand furnace. At firſt an acid ſpirit ariſes, and afterwards a thick oil, called the butter of wax, ſticks in the neck of the retort, unleſs it be heated by applying a live coal. This may be rectified into a thin oil, by diſtilling it ſeveral times, without addition, in a ſand-heat. The butter is an extremely ſoft and anodyne unguent; highly emollient and relaxing; agreeable to the nerves; and, when rubbed on contracted limbs, proves of great benefit to them. It is an excellent liniment for the piles, and takes off the pain attending them in a very ſudden and ſurprizing manner. It alſo keeps the ſkin ſoft, and is one of the beſt things known to keep it from cracking or chopping in the winter.

The oil of wax, has alſo a very ſingular virtue in curing contracted tendons and reſtoring flexibility to the parts. It cures chapped nipples in women who give ſuck beyond any other application, and is as ſucceſsful againſt chapped lips, and the cracking of the ſkin of the hands, only rubbing them once in three or four days with it. It is alſo of great uſe in diſcuſſing cold tumours ariſing on the face, and thoſe on the fingers in winter.

Sealing-WAX is made in the following manner: Take one pound of bees-wax; three ounces of fine turpentine; olive-oil, and roſin, finely powdered, of each one ounce: when they are well melted, and the droſs taken off, put in an ounce and a half of vermillion, or red-lead, finely ground, and ſtir them together till they are well incorporated: and when this mixture grows a little cool roll it into ſticks, or in any other form. If you would have it black, inſtead of vermillion, or red-lead, put in lamp-black. The ſoft, red, and green wax, uſed in large ſeals to ſome of our law-writings, are thus made: Melt bees-wax over a gentle heat, with ſuch a proportion of venice-turpentine as, when cold, will give it the due conſiſtence: this is determined by repeated trials, firſt putting in but little turpentine, and afterwards

more and more, till by dropping a piece upon a marble to cool, it is found of the true conſiſtence. They then colour it with red-lead, or vermilion, or with verditer, or whatever colours they pleaſe; the mixture in this ſtate receiving any.

Grafting-WAX, a compoſition ſerving to bind the graft to the cleft of the ſtock. For the manner of making which, ſee *Methods of* GRAFTING.

To imitate fruit in WAX. Take the fruit and bury it half way in clay; oil its edges, and that part of the fruit which is uncovered; then nimbly throw on it tempered alabaſter or plaſter of Paris, to a conſiderable thickneſs. When this is grown dry and hard, it makes the half mould; the ſecond half of which may be obtained in the ſame manner. The two parts of the mould being joined together, a little bees-wax melted and brought to a due heat, being poured through a hole made in a convenient part of the mould, and preſently ſhook therein, will repreſent the original fruit.

WAX-WORK, the repreſentation of the faces, *&c.* of perſons living or dead; made by applying plaſter of Paris in a kind of paſte, and thus forming a mould containing the exact repreſentation of the features. Into this mould melted wax is poured, and thus a kind of maſks are formed; which being painted and ſet with glaſs eyes, and the figures dreſſed in their proper habits, they bear ſuch a reſemblance that it is difficult to diſtinguiſh between the copy and the original.

WAXING, in chemiſtry, the preparation of any matter to render it fit and diſpoſed to liquify, or melt, which of itſelf it was not.

This is frequently done to enable things to penetrate into metals and other ſolid bodies.

WAY, a paſſage or road. See ROAD.

The roman ways are divided into conſular, prætorian, military, and public; and of theſe we have four remarkable ones in England the firſt, Watling-ſtreet, or Watheling-ſtreet, leading from Dover to London, Dunſtable, Touceſter, Atterſton, and the Severn extending as far as Angleſea in Wales. The ſecond, called Hikenild, or Ikenild ſtreet, ſtretches from Southampton over the river Iſis at Newbridge; thence by Camden and Lichfield; then paſſes the Derwent, near Derby, and ends at Tinmouth. The third, called Foſſe-way, becauſe in ſome places it was never perfected, but lies as a large ditch, leads from Cornwal thro' Devonſhire, by Tethbury, near Stow in the Wolds; and beſide Coventry to Leiceſter, Newark, and ſo to Lincoln. The fourth, called Erming, or Erminage-ſtreet, extends from St. David's, in Wales, to Southampton.

High-WAY. See HIGH-WAY.

Milky-WAY. See GALAXY.

WAY *of a ſhip*, is ſometimes the ſame as her rake, or run forward or backward: but this term is moſt commonly underſtood of her ſailing. Thus when ſhe goes a-pace, it is ſaid that ſhe hath a good way, or makes a freſh way. So when an account is kept how faſt ſhe fails by the log, it is called keeping an account of her way; and becauſe moſt ſhips are apt to fall a little to leeward of their true courſe, they always in caſting up the log-board, allow ſomething for her leeward way.

WAY *of the rounds*, in fortification, is a ſpace left for the paſſage of the rounds between the rampart and the wall of a fortified town. This is not now much in uſe; becauſe the parapet, not being above a foot thick, is ſoon overthrown by the enemy's cannon.

WAY-WISER, an inſtrument otherwiſe called perambulator. See the article PERAMBULATOR.

WAY-WODE, a title given to the governors of the chief places in the empire of Muſcovy, as alſo in Poland.

WEAR, or WEER, a great ſtank or dam in a river, fitted for the taking of fiſh, or for conveying the ſtream to a mill.

New wears are not to be made, or others altered, to the nuſance of the public, under a certain penalty.

WEASEL, in zoology, a ſpecies of Muſtela, with the tip of the tail black. See the article MUSTELA.

This is a ſmaller animal than the polecat: the head is ſmall, of an ovated form, and ſharp at the ſnout: the ears are ſmall, ſhort and patulous: the eyes of a fierce aſpect: the mouth well furniſhed with teeth: the upper jaw longer than the under: the body is about eight inches long, and ſlender: the tail is a third part the length of the body the legs are ſhort and ſlender: the feet have five toes armed with ſharp claws: the whole body is covered with a fine and tolerably long fur: the back is of a darkiſh colour, and the belly is white.

WEATHER, the ſtate or diſpoſition of the atmoſphere with regard to heat, cold, wind, rain, froſt, &c.

As it is in the atmoſphere that all plants and animals live, and as that appears to be the great principle of moſt animal and vegetable productions, alterations, &c. there does not ſeem any thing, in all philoſophy, of more immediate concernment to us than the ſtate of the weather, and a knowledge of the great influence it has on our bodies. What vaſt, but regular, alterations a little turn of weather makes in a tube filled with mercury, or ſpirits of wine, or in a piece of ſtring, &c. every body knows, in the common inſtance of barometers, thermometers, &c. and it is owing partly to our inattention, and partly to our unequal and intemperate courſe of living, that we do not feel as great and regular ones in the tubes, chords, and fibres of our own bodies.

WEATHER-COCK, or WEATHER-VANE, a moveable vane in form of a cock, or other ſhape, placed on high, to be turned round according to the direction of the wind, and point out what quarter the wind blows from. See WIND.

WEATHER-GLASSES, are inſtruments contrived to indicate the ſtate or diſpoſition of the atmoſphere, and the various alterations in the weather: ſuch are barometers, thermometers, hygrometers, &c. See the articles BAROMETER, THERMOMETER, &c.

WEATHER-GAGE, in the ſea-language. See the article GAGE.

WEATHERING, among ſailors, ſignifies the doubling, or ſailing by a headland, or other place.

WEAVING, the art of working a web of cloth, ſilk, or other ſtuff, in a loom with a ſhuttle. For the manner of performing which ſee the article CLOTH, &c.

WEAVING-LOOM, a machine for weaving cloth, ſilk, &c. by raiſing the threads of the warp in order to throw in the ſhoot, and ſtrike it cloſe. Of theſe there are various kinds, diſtinguiſhed by the different ſorts of cloths, ſtuffs, ſilks, &c. in which they are employed, and which are chiefly diſtinguiſhed by the number and variety of the threads they raiſe in order to work the warp, either plain or in figures, by making more or leſs of the woof or ſhoot appear through the warp. In order to give a general idea of weaving we ſhall here deſcribe the parts of the common weaver's loom. See plate CCXCII. fig. 2. in which 9, 9, are the loom-poſts: 10. the croſs-bars: 11. the batten; which ſerves to ſtrike in, and cloſe more or leſs the threads of the woof: 12. the cap of the batten, or a long bar, which the weaver takes hold of in one hand and then in the other: 13. The block, or under part of the ſame, containing the reed within the lower bar: 14. the croſs-piece, or burdon and pin, which helps to make the batten moveable: 15. the gallows; a piece of wood ſuſpending the pully, on which the cord moves that is tied to the two lams: 16. the breaſt-bar; a flat ſquare piece of wood, with an opening in it to let the ſtuff through, which is rolled on the knee-roll: 17. the cane-roll, which the warp is turned on at the other end of the loom: 18. the reed: 20. pullies, upon which the cords roll that are faſtened to the lams: 21. the tumbler; which is a cord that paſſes from one lam to the other over the pully 20, and cauſes the working of the lams by its aſcending and deſcending: 22. the muffle in which the pully acts: 23. a ſkain, or leiſh, cut into proper lengths, to mend the leiſhes of the harneſs that happen to break: 24. a bobbin of the warp, to mend the threads of the warp that occaſionally break: 25. lizier thread, to mend thoſe of the lizier that happen to break; and which, eſpecially in cloth, are very different from the warp: 26. the box to hold the quills: 28. the foot-bar: 29. the trundles, or moveable bars, tied with two cords to the lower virgee of each lam. When the foot preſſes a treadle, the lam that is faſtened to it ſinks, and the other riſes by the help of the tumbler: 30. the foot-ſtep: 31. the temple; a double flat ruler, having ſmall teeth at the extremities; it may be lengthened or ſhortened by the help of a catch that is in one of the rulers, and introduced in a groove in the other ruler. The teeth in the extremities are faſtened in the lizier of the work, by which means it is kept of an equal breadth; and as the work advances the temple is moved forwards: 32. the ſhuttle ſeen in front and profile: 33. the knee-roll, on which the work is rolled as it is wove: 34. the tantow; an iron leaver to turn the knee-roll: 35. the reed ſeen ſeparate.

WEB, a ſort of tiſſue, or texture formed of threads interwoven with each other; ſome whereof are extended in length, and called the warp; and others drawn acroſs, and called the woof. See the articles CLOTH, WARP, *&c.*

Spider's WEB, or COBWEB. See the article COBWEB.

WEDGE, *cuneus*, one of the mechanical powers, as they are called. See POWER.

The wedge is a triangular priſm, whoſe baſes are equilateral acute-angled triangles. See PRISM, *&c.*

The power of the wedge A C B H (plate CCXCVII. fig. 3.) is evident from its conſiſting of two equal inclined planes, A H C and B H C: but as it is chiefly uſed to ſeparate the adhering parts of wood, the coheſion of which is every where variable and uncertain, there can be no regular calculation of the actual effect of the wedge, in this caſe. But if we ſuppoſe the power of coheſion in the wood A D E B to be uniform, or to make every where an equal reſiſtance to the wedge A B C, dividing its parts A F and B G; then the power of the wedge would be to the reſiſtance of the wood, as their velocities inverſely, that is, as the ſpaces moved through in the ſame time, that is, as the height of the wedge H C to half its width A H.

WEED, a common name for all rank and wild herbs, that grow of themſelves, to the detriment of other uſeful herbs they grow among.

WEED, in the miners-language, denotes the degeneracy of a load or vein of fine metal into an uſeleſs marcaſite.

WEEK, *ſeptimana*, *hebdomada*, in chronology, a diviſion of time compriſing ſeven days.

The origin of this diviſion of weeks, or of computing time by ſevenths, is greatly controverted. Some will have it to take its riſe from the four quarters or intervals of the moon, between her changes or phaſes, which, being about ſeven days diſtant, gave occaſion to the diviſion.

Be this as it will, the diviſion is certainly very antient. The Syrians, Egyptians, and moſt of the oriental nations, appear to have uſed it from all antiquity: though it did not get footing in the weſt till Chriſtianity brought it in: the Romans reckoned their days not by ſevenths but by ninths, and the antient Greeks by decads or tenths.

Indeed, the Jews divided their time by Weeks, but it was upon a different principle from the eaſtern nations. God himſelf appointing them to work ſix days, and to reſt the ſabbath, in order to keep up the ſenſe and remembrance of the creation; which being effected in ſix days, he reſted the ſeventh.

Paſſion WEEK, or the *Holy* WEEK, is the laſt week in Lent, wherein the church celebrates the myſtery of our Saviour's death and paſſion.

WEEK, or WYCK, in geography, a parliament and port-town of Scotland, in the ſhire of Cathneſs: weſt long. 2° 45′, north lat. 58° 40′.

WEEN, or HUEN, a little iſland in the ſound, at the entrance into the Baltic, ſixteen miles north of Copenhagen.

WEEVER, in ichthyology, the trachinus with the lower jaw longeſt, and without beards. See TRACHINUS.

It grows to ſix or eight inches in length, and is thick in proportion: the head is large and compreſſed, the eyes ſtand near one another at the top of it; the iris is of a gold yellow, the body is compreſſed, the lateral line ſtraight; there is on each ſide at the opercula a large and robuſt ſpine; the tail is ſcarce at all forked; the firſt back fin has five prickly rays; the ſecond has thirty-one; the pectoral fins have each ſixteen rays, and the pinna ani has thirty-two.

WEIDEN, a town of Bavaria, ſituated on the river Nab, fifteen miles north of Amberg.

WEIGH, WAY, or WEY, *waga*, a weight of cheeſe, wool, *&c.* containing 256 pounds avoirdupoiſe. Of corn, the weigh contains forty buſhels; of barley or malt, ſix quarters. In ſome places, as Eſſex, the weigh of cheeſe is 300 pounds.

WEIGHER, an officer in divers cities appointed to weigh the commodities bought or ſold in a public ballance.

WEIGHING, the act of examining a body in the ballance to find its weight.

WEIGHING-CHAIR, a machine contrived, by Sanctorius, to determine the quantity of food taken at a meal, and to warn the feeder when he had his quantum.

WEIGHING-ANCHOR, is the drawing it out of the ground it had been caſt into, in order to ſet ſail, or quit a port, road, or the like.

WEIGHT, GRAVITY, *pondus*, in phyſics, a quality in natural bodies whereby they tend downwards, towards the center of the earth. Or, weight may be defined, in a leſs limited manner, to be a power

inherent in all bodies whereby they tend to ſome common point, called the center of gravity; and that with a greater or leſs velocity, as they are more or leſs denſe, or as the medium they paſs through is more or leſs rare.

In the common uſe of language, weight and gravity are conſidered as one and the ſame thing. Some authors, however, make a difference between them; and hold gravity only to expreſs a nitus or endeavour to deſcend, but weight an actual deſcent. But there is room for a better diſtinction. In effect, one may conceive gravity to be the quality as inherent in the body; and weight the ſame quality, exerting itſelf either againſt an obſtacle, or otherwiſe. Hence, weight may be diſtinguiſhed, like gravity, into abſolute and ſpecific. See GRAVITY.

Sir Iſaac Newton demonſtrates, that the weights of all bodies, at equal diſtances from the center of the earth, are proportionable to the quantities of matter each contains. Whence it follows, that the weights of bodies have not any dependence on their forms, or textures; and that all ſpaces are not equally full of matter. Hence, alſo, it follows, that the weight of the ſame body is different, on the ſurface of different parts of the earth; by reaſon its figure is not a ſphere, but a ſpheroid. See EARTH.

WEIGHT, *pondus*, in mechanics, is any thing to be raiſed, ſuſtained, or moved by a machine, or any thing that in any manner reſiſts the motion to be produced.

WEIGHT, in commerce, denotes a body of a known weight, appointed to be put in the ballance againſt other bodies, whoſe weight is required.

The ſecurity of commerce depending, in good meaſure, on the juſtneſs of weights, which are uſually of lead, iron, or braſs, moſt nations have taken care to prevent the falſification thereof, by ſtamping or marking them by proper officers, after being adjuſted by ſome original ſtandard. Thus, in England, the ſtandard of weights is kept in the exchequer, by a particular officer called the clerk of the market. See the article CLERK.

Weights may be diſtinguiſhed into antient and modern, foreign and domeſtic.

Antient WEIGHTS, 1. Thoſe of the antient Jews, reduced to the Engliſh troy weights, will ſtand as in the following table:

					lb.	oz.	dwt.	gr.
Shekel					00	00	09	$02\frac{4}{7}$
60	Maneh				02	03	06	$10\frac{2}{7}$
3000	50	Talent			113	10	01	$10\frac{2}{7}$

2. Grecian and Roman weights, reduced to engliſh troy weight, will ſtand as in the following table:

							oz.	dwt.	gr.
Lentes							00	00	$\frac{85}{112}$
4	Siliquæ						00	00	$03\frac{1}{28}$
12	3	Obolus					00	00	$09\frac{3}{28}$
24	6	2	Scriptulum				00	00	$18\frac{3}{14}$
72	18	6	3	Drachma			00	02	$06\frac{9}{14}$
96	24	8	4	$1\frac{1}{3}$	Sextula		00	03	$00\frac{6}{7}$
144	56	12	6	2	$1\frac{1}{2}$	Sicilicus	00	04	$13\frac{2}{7}$
192	48	16	8	$2\frac{2}{3}$	2	$1\frac{1}{3}$ Duella	00	06	$01\frac{5}{7}$
576	144	48	24	8	6	4 3	Uncia	00	18	$05\frac{1}{7}$
6912	1728	576	288	96	72	48	36	12	Libra	10	18	$13\frac{5}{7}$

The roman ounce is the engliſh avoirdupois-ounce, which they divided into ſeven denarii, as well as eight drachms; and ſince they reckoned their denarius equal to the attic drachm, this will make the attic weights one eighth heavier than the correſponding roman weights.

Modern European WEIGHTS. 1. Engliſh weights: By the twenty-ſeventh chapter of magna charta, the weights all over England are to be the ſame; but for different commodities, there are two different ſorts, *viz.* Troy weight and avoirdupoiſe weight. The origin from which they

they are both raiſed, is a grain of wheat gathered in the middle of the ear.

In troy weight, twenty-four of theſe grains make a penny-weight ſterling; twenty penny-weights make one ounce; and twelve ounces one pound. See TROY.

By this weight we weigh gold, ſilver, jewels, grains, and liquors. The apothecaries alſo uſe the troy pound, ounce, and grain; but they differ from the reſt in the intermediate diviſions. They divide the ounce into eight drachms; the drachm into three ſcruples, and the ſcruple into twenty grains.

In avoirdupoiſe weight, the pound contains ſixteen ounces, but the ounce is leſs by near one-twelfth than the troy ounce; this latter containing 490 grains, and the former only 448. The ounce contains 16 drachms. 80 ounces avoirdupoiſe are only equal to 73 ounces troy; and 17 pounds troy equal to 14 pounds avoirdupoiſe. See AVOIRDUPOISE.

By avoirdupoiſe weight are weighed mercury, and grocery wares, baſe metals, wool, tallow, hemp, drugs, bread, *&c.*

Table of Troy Weight as uſed by the

Goldſmiths.

Grains.

24		Penny-weight.
480	20	Ounce.
5760	240	12 Pound.

Apothecaries.

Grains.

20			Scruple.
60	3		Drachm.
480	24	8	Ounce.
5760	288	96	12 Pound.

Table of Avoirdupoiſe Weight.

Scruples.

3	Drachm.			
24	8	Ounce.		
384	128	16	Pound.	
43008	14336	1792	112	Quintal, or Hundred.
860160	286720	35840	2240	20 Ton.

The moneyers, jewellers, *&c.* have a particular claſs of weights, for gold and precious ſtones, *viz.* carat and grain; and for ſilver, the penny-weight and grain. See the article CARACT.

The moneyers have alſo a peculiar ſubdiviſion of the grain troy: Thus,

The { Grain, Mite, Droit, Perit } into { 20 Mites. 24 Droits. 20 Perits. 24 Blanks. }

The dealers in wool have likewiſe a particular ſet of weights, *viz.* the ſack, weigh, tod, ſtone, and clove.

2. French weights: The common or Paris pound is 16 ounces; which they divide two ways: the firſt diviſion is into 2 marcs; the marc into 8 ounces; the ounce into 8 gros; the gros into 3 penny-weights; the penny-weight into 24 grains; the grain equivalent to a grain of wheat. The ſecond diviſion of the pound is into 2 half-pounds; the half-pound into 2 quarters; the quarter into 2 half-quarters; the half-quarter into two ounces; and the ounce into two half-ounces.

The weights of the firſt diviſion are uſed to weigh gold, ſilver, and the richer commodities: and the weights of the ſecond diviſion, for commodities of leſs value.

Grains.

24				Penny-weight.
72	3			Gros.
576	24	8		Ounce.
4608	192	64	8	Marc.
9216	384	128	16	2 Pound.

Half-ounce.

2					Ounce.
4	2				Half-quarter pound.
8	4	2			Quarter-pound.
16	8	4	2		Half-pound.
32	16	8	4	2	Pound.
3200	1600	800	400	200	100 Quintal.

But

But the pound is not the ſame throughout France. At Lyons, e. gr. the city pound is only 14 ounces: So that 100 Lyons pounds make only 88 Paris pounds. But beſide the city pound, they have another at Lyons for ſilk, containing 16 ounces. At Tholouſe, and throughout the Upper-Languedoc, the pound is 13 ounces and a half of Paris weight. At Marſeilles, and throughout Provence, the pound is 13 ounces of Paris weight. At Rouen, beſide the common Paris pound and marc, they have the weight of the vicomte; which is 16 ounces, a half, and five-ſixths of the Paris weight. The weights, enumerated under the two articles of engliſh and french weights, are the ſame that are uſed throughout the greateſt part of Europe; only under ſomewhat different names, diviſions and proportions.

Particular nations have alſo certain weights peculiar to themſelves: thus, Spain has its arrobas, containing 25 ſpaniſh pounds, or one-fourth of the common quintal: its quintal macho, containing 150 pounds, or one-half common quintal, or 6 arrobas: its adarme, containing one-ſixteenth of its ounce. And for gold, it has its caſtillan, or one-hundredth of a pound. Its tomin, containing 12 grains, or one-eighth of a caſtillan. The ſame are in uſe in the Spaniſh Weſt-Indies.

Portugal has its arroba, containing 32 Liſbon arratels, or pounds: Savary alſo mentions its faratelle, containing 2 Liſbon pounds: and its rottoli, containing about 12 pounds. And for gold, its chego, containing four carats. The ſame are uſed in the Portugueſe Eaſt-Indies.

Italy, and particularly Venice, have their migliaro, containing four mirres; the mirre containing 30 Venice pounds: The ſaggio, containing a ſixth part of an ounce. Genoa has five kinds of weights, *viz.* large weights, whereby all merchandizes are weighed at the cuſtom-houſe: caſh weights for piaſtres, and other ſpecies: the cantara, or quintal, for the coarſeſt commodities: the large ballance for raw ſilks; and the ſmall ballance for the finer commodities. Sicily has its rottolo, 32 and a half pounds of Meſſina.

Germany, Flanders, Holland, the Hanſe towns, Sweden, Denmark, Poland, *&c.* have their ſchippondt, which at Antwerp and Hamburgh, is 300 pounds; at Lubeck, 320; and at Coningſberg, 400 pounds. In Sweden, the ſchippondt for copper is 320 pounds; and the ſchippondt for proviſions 400 pounds. At Riga and Revel, the ſchippondt is 400 pounds; at Dantzic, 340 pounds; in Norway, 300 pounds; at Amſterdam, 300; containing 20 lyſpondts, each weighing 15 pounds.

In Muſcovy, they weigh their large commodities by the bercheroct, or berkewits, containing 400 of their pounds. They have alſo the poet, or poede, containing 40 pounds, or one-tenth of the bercheroct.

In order to ſhew the proportion of the ſeveral weights uſed throughout Europe, we ſhall add a reduction of them to one ſtandard, *viz.* the London and Amſterdam-pound.

1. Proportion of the weights of the principal places of Europe.

The 100 ℔. of England, Scotland, and Ireland are equal to

℔	oz.	
91	8	of Amſterdam, Paris, *&c.*
96	8	of Antwerp or Brabant.
88	0	of Rouen, the viſcounty weight.
106	0	of Lyons, the city weight.
90	9	of Rochelle.
107	11	of Toulouſe and upper Languedoc.
113	0	of Marſeilles or Provence.
81	7	of Geneva.
93	5	of Hamburgh.
89	7	of Francfort, *&c.*
96	1	of Leipſick, *&c.*
137	4	of Genoa.
132	11	of Leghorn.
153	11	of Milan.
152	0	of Venice.
154	10	of Naples.
97	0	of Seville, Cadiz, *&c.*
104	13	of Portugal.
96	5	of Leige.
112	$\frac{2}{3}$	of Ruſſia.
107	$\frac{1}{3\frac{1}{4}}$	of Sweden.
89	$\frac{1}{2}$	of Denmark.

2. Proportion of the weights of the chief cities in Europe, to thoſe of Amſterdam.

An 100 pounds of Amſterdam are equal to ℔

108 of Alicant.
105 of Antwerp.
120 of Archangel, or 3 poedes.
105 of Arſchot.
120 of Avignon.

lb
98 of Basil in Switzerland.
100 of Bayonne in France.
166 of Bergamo.
97 of Bergen-op-zom.
95¼ of Bergen in Norway.
111 of Bern.
100 of Besançon.
100 of Bilboa.
105 of Bois le duc.
151 of Bologna.
100 of Bourdeaux.
104 of Bourg en Bresse.
103 of Bremen.
125 of Breslaw.
105 of Bruges.
105 of Brussels.
105 of Cadiz.
105 of Cologne.
125 of Coningsberg.
107½ of Copenhagen.
87 rottos of Constantinople.
113½ of Dantzic.
100 of Dort.
97 of Dublin.
97 of Edinburgh.
143 of Florence.
98 Francfort on the Maine.
105 of Gaunt.
89 of Geneva.
163 of Genoa, cash weight.
102 of Hamburgh.
106 of Leyden.
105 of Leipsic.
105 ½ of Liege.
114 of Lisle.
143 of Leghorn.
106 ½ of Lisbon.
109 of London, avordupoise weight.
105 of Lovaine.
105 of Lubec.
141 ½ of Lucca, light weight.
116 of Lyons, city weight.
114 of Madrid.
105 of Marlines.
123 ½ of Marseilles.
154 of Messina, light weight
168 of Milan.
120 of Montpelier.
125 bercheroets of Muscovy.
100 of Nantes.
106 of Nancy.
169 of Naples.
98 of Nuremberg.
100 of Paris.
112½ of Revel.
109 of Riga.
100 of Rochelle.
146 of Rome.
100 of Rotterdam.

lb
96 of Rouen, viscounty weight.
100 of St. Malo.
100 of St. Sebastian.
158½ of Saragosa.
106 of Seville.
114 of Smyrna.
110 of Stetin.
81 of Tholouse and upper Languedoc.
151 of Turin.
158 ½ of Valencia.
182 of Venice, small weight.

WEIGHTS, *used in the several parts of Asia, the East-Indies, China, Persia, &c.* In Turky, at Smyrna, *&c.* they use the batman, or battemant, containing six occos; the occo weighing three pounds four-fifths English. They have another batman much less, consisting, as the former, of six occos: but the occo only containing fifteen ounces english: 44 occos of the first kind make the turkish quintal. At Cairo, Alexandretta, Aleppo, and Alexandria, they use the rotto, rotton, or rottoli. The rottoli at Cairo, and other parts of Egypt, is 144 drachms; being somewhat over an english pound. At Aleppo there are three sorts of rottos; the first 720 drachms, making about seven pounds english, and serving to weigh cottons, galls, and other large commodities: the second is 624 drachms, used for all silks but white ones, which are weighed by the third rotto of 700 drachms. At Seyda the rotto is 600 drachms.

The other ports of the Levant, not named here, use some of these weights; particularly the occo, or occqua, the rottoli, and rotto.

The chinese weights are the piece, for large commodities; it is divided into 100 catis, or cattis; though some say into 125; the cati into 16 taels, or tales; each tael equivalent to 1 ⅓ of an ounce english, or the weight of one rial and $\frac{1}{12}$, and containing twelve mas, or masses, and each mas 10 condrins. So that the Chinese piece amounts to 137 pounds english avoirdupois, and the cadi to 1 pound 8 ounces. The picol for silk containing 66 catis and ¾, the bahar, bakaire, or barr, containing 300 catis.

Tonquin has also the same weights, measures, *&c.* as China. Japan has only one weight, *viz.* the cati; which, however, is different from that of China, as containing 20 taels. At Surat, Agra, and throughout the states of the great mogul,

mogul, they uſe the man, or maund, whereof they have two kinds; the king's man, or king's weight; and the man ſimply; the firſt uſed for the weighing of common proviſions, containing 40 ſeers, or ſerres; and each ſeer a juſt Paris pound. The common man, uſed in the weighing of merchandize, conſiſts likewiſe of 40 ſeers, but each ſeer is only eſtimated at 12 Paris ounces, or $\frac{3}{4}$ of the other ſeer.

The man may be looked on as the common weight of the Eaſt-Indies, though under ſome difference of name, or rather of pronunciation; it being called mao at Cambaya, and in other places mein, and maun. The ſeer is properly the Indian pound, and of univerſal uſe; the like may be ſaid of the bahar, tael, and catti above-mentioned.

The weights of Siam, are the piece containing two ſhans, or cattis; but the Siameſe catti is only half the Japoneſe, the latter containing 20 taels, and the former only 10; though ſome make the Chineſe catti only 16 taels, and the Siameſe 8. The tael contains 4 baats or ticals; each about a Paris ounce; the baat 4 ſelings, or mayons; the mayon 2 fouangs; the fouang 4 payes; the paye 2 clams; the ſompaye half a fouang.

It is to be obſerved, that thoſe are the names of their coins as well as weights; ſilver and gold being commodities there ſold, as other things, by their weights.

In the iſle of Java, and particularly at Bantam, they uſe the gantan, which amounts to near three dutch pounds. In Golconda, at Viſapour, and Goa, they have the ſuratelle containing 1 pound 14 ounces engliſh; the mangalis or mangelin for weighing diamonds and precious ſtones, weighing at Goa 5 grains, at Golconda, &c. 5 $\frac{1}{2}$ grains. They have alſo the rotolo containing 14 $\frac{1}{2}$ ounces engliſh; the metricol containing the ſixth part of an ounce; the wall for piaſters and ducats, containing the 73d part of a rial.

In Perſia they uſe two kinds of batmans or mans, the one called cahi or cheray, which is the king's weight; and the other batman of Tauris. The firſt weighs 13 pounds 10 ounces engliſh; the ſecond, 6 pounds $\frac{1}{2}$. Its diviſions are the ratel, or a 16th; the derhem or drachm, which is the 50th; the meſchal, which is half the derhem; the dung, which is the 6th part of the meſchal, being equivalent to ſix carat-grains; and, laſtly, the grain which is the fourth part of the dung. They have alſo the vakie, which exceeds a little our ounce; the ſah-cheray, equal to the 1170th part of the derhem; and the toman uſed to weigh our large payments of money, without telling; its weight is that of 50 abaſſis.

African and American weights. We have little to ſay as to the weights of America: the ſeveral european colonies there making uſe of the weights of the ſtates or kingdoms of Europe they belong to. For, as to the aroue of Peru, which weighs 27 pounds, it is evidently no other than the ſpaniſh arroba with a little difference in the name.

As to the weights of Africa, there are few places that have any, except Egypt, and the countries bordering on the Mediterranean; whoſe weights have been already enumerated among thoſe of the ports of the Levant. The iſland of Madagaſcar indeed has weights, but none that exceed the drachm, nor are they uſed for any thing but gold and ſilver.

WEIGHT *of the air*. See AIR.

WEIL, or WEYL, an imperial city of Germany, in the circle of Swabia, and dutchy of Wirtemburg: eaſt long. 8° 40′, north lat. 48° 40′.

WEILBURG, a town of Germany, in the territory of Weteravia, and county of Naſſaw, twenty-ſix miles north of Franckfort.

WEIMAR, a city of Germany, in the circle of Upper Saxony, the capital of the dutchy of Weimar: eaſt long. 11° 25′, north lat. 51°

WEINGARTEN, a town of Germany, in the palatinate of the Rhine, twenty-five miles ſouth-weſt of Heidelburg.

WEINHEIM, a town of Germany, in the palatinate of the Rhine, ten miles north of Heidelburg.

WEISCHELMUNDE, or MUNDE, a fort of poliſh Pruſſia, at the mouth of the Viſtula, which defends the harbour of Dantzick.

WEISEL, a river of Poland, and the ſame with the Viſtula. See VISTULA.

WEISSENBURG, or CRONWEISSENBURG, a town of Germany, in the circle of the upper Rhine, and Landgravate of Alſace, twenty miles ſouth-weſt of Philipſburg.

WEISSENBURG, or STULWEISSENBURG, a city of Lower Hungary, ſituated near the eaſt end of the Platten Sea, thirty-ſix miles ſouth-weſt of Buda.

WEISSENBURG, a town of Tranſilvania, thirty miles weſt of Hermanſtat.

WEISSENBURG, a town of Germany, in the circle of Franconia, twenty miles north-weſt of Ingolſtat.

WEISSENFELD, a town of Germany, in the circle of Upper Saxony, and marquiſate of Miſnia, ſeventeen miles ſouth-weſt of Leipſick.

WELCHPOLE, a maket-town of Montgomeryſhire, ſituated ſix miles north of Montgomery.

WELD, or WOLD, *luteola*, in botany, the ſame with the reſeda of Linnæus. See the article RESEDA.

WELDING HEAT, in ſmithery, a degree of heat given to iron, *&c.* ſufficient only for bending, or doubling it up. See the articles FORGING and HEAT.

WELL, a hole under ground, uſually of a cylindrical figure, and walled with ſtone and mortar: its uſe is to collect the water of the ſtrata around it.

WELL, in the military art, a depth which the miner ſinks under ground, with branches or galleries running out from it; either to prepare a mine, or to diſcover and diſappoint the enemy's mine.

WELL-HOLE, in building, is the hole left in a floor for the ſtairs to come up through. See the article STAIRS.

WELLS, a city of Somerſetſhire, ſituated ſixteen miles ſouth-weſt of the city of Bath, both which cities have but one biſhop.

This is alſo the name of a town of Germany, in the circle of Auſtria, ſituated eleven miles ſouth of Lintz.

WELLAND, a river which riſing in Leiceſterſhire, and running eaſtward between the counties of Rutland and Northampton, and afterwards north-eaſt by Stamford, falls into a bay of the German Sea, which divides the counties of Lincoln and Norfolk.

WELLINGBOROUGH, a market-town of Northamptonſhire, ſituated on the river Nen, ten miles north-eaſt of Northampton.

WELLINGTON, a market town of Shropſhire, ſituated ten miles eaſt of Shrewſbury.

WEM, a market town of Shropſhire, ſituated eight miles north of Shrewſbury.

WEN, a tumour or excreſcence that ariſes on different parts of the body, and contains a cyſtus, or bag filled with ſome peculiar matter, of which phyſicians reckon three kinds, *viz.* when this matter is ſoft, reſembling pulp, the wen is called atheroma; if like honey, meliceris; and if like ſuet, ſteatoma. See the articles TUMOUR, ATHEROMA, *&c.*

WENDOVER, a borough-town of Bucks, ſix miles ſouth of Aileſbury; which ſends two members to parliament.

WENER, a lake in Sweden, in the province of Gothland, ſeventy miles in length, and fifty in breadth.

WENLOCK, a borough-town of Shropſhire, ten miles ſouth-eaſt of Shrewſbury; which ſends two members to parliament.

WENSUSSEL, the north diviſion of Jutland, in Denmark, having the Categate-Sea on the north; the Schaggerrack Sea, on the eaſt; the province of Wiburg on the ſouth; and the German Sea on the weſt.

WEOBLEY, a borough-town of Herefordſhire; twelve miles north-weſt of Hereford; which ſends two members to parliament.

WERCHTEREN, a town of the auſtrian Netherlands, in the province of Brabant, nine miles eaſt of Mechlin.

WERDEN, a town of Germany, in the circle of Weſtphalia, ten miles north-eaſt of Duſſeldorp.

WERE, in our old law-books, denotes a ſum paid for killing a perſon, when ſuch crimes were puniſhed with pecuniary mulcts, and not death.

WERELADA, among our ſaxon anceſtors, the denying an homicide on oath, in order to be quit of the fine called WERE.

WERGILD, or WEREGELD, in our antient cuſtoms, the price of a man's head, a part of which was paid to the king, for the loſs of his ſubject, a part to the lord whoſe vaſſal he was, and a part to the neareſt relation of the perſon ſlain.

WERMELAND, a province of Sweden, lying between the province of Dalecarlia, on the north, and the lake Wener on the ſouth.

WESEL, a city of Germany, in the dutchy of Cleves: eaſt long. 6° 5′, north lat. 51° 37′.

WEISEL, a river of Poland, alſo called the Viſtula. See VISTULA.

WESER, a river of Germany, which riſes in the Landgravate of Heſſe, runs between the circles of Weſtphalia and lower Saxony, and falls into the German Sea below Carlſtat.

WEST, in coſmography, one of the cardinal points of the horizon, diametrically oppoſite to the eaſt; and ſtrictly defined, the interſection of the prime verti-

cal with the horizon, on that ſide the ſun ſets in. See HORIZON, &c.

In aſtronomy, weſt is chiefly uſed for the place in, or towards which, the ſun or ſtars ſink under the horizon. Thus we ſay, the ſun, mars, &c. are in the weſt. The point the ſun ſets in, when in the equator, is particularly called, the equinoctial weſt, or point of true weſt. See the article EQUINOCTIAL.

In geography, weſt and weſtern, are applied to ſeveral countries, &c. ſituate towards the point of ſun-ſetting, with reſpect to certain others. Thus the roman empire was antiently, and the german empire is at preſent, called the empire of the weſt, or the weſtern empire, in oppoſition to that of Conſtantinople, which is called the eaſtern empire. The roman church is called the weſtern church, in oppoſition to the greek church. The The Italians, French, Spaniards, &c. are called weſtern nations, in reſpect to the Aſiatics; and part of America, the Weſt-Indies, in reſpect to the Eaſt-Indies.

WESTBURY, a borough-town of Wiltſhire, twenty miles north-weſt of Saliſbury; which ſends two members to parliament.

WESTERN ISLES. See AZORES and HEBRIDES.

WESTLOW, a borough-town of Cornwal, twenty-three miles ſouth-weſt of Launceſton; which ſends two members to parliament.

WESTMANIA, a province of Sweden, having Upland on the eaſt, and Wermeland on the weſt.

WESTMEATH, a county of Ireland, in the province of Leinſter, bounded by Longford and Cavan on the north; by Eaſtmeath, on the eaſt; by King's County, on the ſouth; and by the river Shannon, which divides it from Roſcommon, on the weſt.

WESTMINSTER, a city which forms the weſt part of the town which goes by the general name of London; but is under a diſtinct government; the dean and chapter appointing the high ſteward, high bailiff, and other officers, who have the government of the city. Here are the king's palaces, and the houſes of moſt of the nobility, the high court of parliament, and the ſupreme courts of juſtice; but there is no biſhop of this city. It elects two members of Parliament. See the article LONDON.

WESTMORELAND, an engliſh county bounded by Cumberland, on the north; by Yorkſhire on the eaſt; by Lancaſhire, on the ſouth; and by the Iriſh Channel on the weſt.

WESTPHALIA, the north-weſt circle of the empire of Germany, bounded by the german ocean, on the north; by the circle of Lower Saxony, on the eaſt; by the Landgravate of Heſſe, the Palatinate of the Rhine, and the electorate of Triers, on the ſouth; and by the Netherlands on the weſt; being 200 miles in length, and from 150 to 200 in breadth.

WESTRAM, a market-town of Kent, under the meridian of London, 44 miles weſt of Canterbury.

WETER, a ſwediſh Lake, in the province of Gothland, ninety miles long.

WETTERAVIA, or WETTERAW, the ſouthern diviſion of the Landgravate of Heſſe, in Germany, lying along the northern bank of the river Maine, comprehending the counties of Hanau and Naſſau.

WETZLAR, an imperial city of Germany, in the circle of the upper Rhine and territory of Wetteravia, ſituated on the river Lohn, eaſt long. 8° 15′, north lat. 50° 30′.

WEXFORD, a county of Ireland, in the province of Munſter, bounded by the county of Wicklow, on the north; by the ocean on the eaſt and ſouth; and by Kilkenny and Waterford on the weſt. Wexford, the capital of this county, is ſituated at the mouth of the river Slaney, ſixty five miles ſouth of Dublin.

WEYMOUTH, a port-town of Dorſetſhire, ſituated on a fine bay of the engliſh channel, ſeven miles ſouth of Dorcheſter. It ſends two members to parliament.

WHALE, *balæna*, in ichthyology. See the article BALÆNA.

The balæna, with the fiſtula in the middle of the head, and the back ridged toward the tail, is the fiſh determinately and properly called the whale, though the phyſeter, as well that with the upper jaw longeſt, and with a long ſpine on the back, as that with the back fin very tall, and the ſummit of the teeth plane, is the former called the crooked toothed whale, and the latter the plane toothed whale; as is alſo that phyſeter which is a ſpecies of the balæna. See PHYSETER.

The balæna, or the whale properly ſo called, grows to a monſtruous ſize; the head is extremely large, and of an irregular figure, the lower jaw is much larger than the upper, and covers it at the ſides; the upper is narrow and oblong, the fiſtua is double, or has two

diſtinct apertures, and is ſituated in the middle of the head, between the eyes; the eyes are very ſmall in proportion to the enormous bulk of the head, and are placed a great diſtance from one another; the whole head is ſomewhat depreſſed, and has ſeveral irregularities on its ſurface; the body is very thick, and ſomewhat rounded, but towards the extremity of the back, there is a ſubacute angle, extending itſelf longitudinally to the tail; the tail is ſomewhat forked, very large, and in its horizontal ſituation makes a very ſingular figure. This is an inhabitant of the moſt northern ſeas, the principal object of the Greenland fiſhery, and the firſt known ſpecies.

For the manner of fiſhing for the whale, ſee the article FISHERY.

WHALE-BONE, or as it is otherwiſe called, whale-fins, in commerce, a commodity procured from the whale, uſed as ſtiffening in ſtays, fans, buſks, ſkreens, &c. What we call whale-bone, or fins, is a horny laminæ in the upper jaw of the balæna, which ſupply the place of teeth, but there are none ſuch in the lower jaw. Theſe laminæ are commonly called whiſkers, which, ſplit and faſhioned, are the whale-bone. The pizzle, or gential member of the animal ſerves likewiſe for the ſame purpoſe. Whale-bone cut, is prohibited to be imported.

Whale-fins of Newfoundland, or any of the britiſh colonies, or plantations, caught and imported in ſhips belonging to Great Britain, pay the pound, on importation, 2 $\frac{81\frac{1}{4}}{100}$ d. and draw back, on exportation, 2 $\frac{81\frac{1}{4}}{100}$ d. Whale-fins of any of the britiſh colonies, caught in ſhips belonging to thoſe parts, but imported in ſhips belonging to Great Britain, pay the ton on importation, 28l. 13s. 9d. and on exportation, draw back 28l. 1s. 10 $\frac{50}{100}$ d. Whale-fins of any of the britiſh colonies, caught and imported in ſhips belonging to thoſe parts, pay the ton, on importation, 31 l. 2s. 6d. and on exportation, draw back 29 l. 18s. 9d. Whale-fins of foreign fiſhing, the ton, pay on importation, 97l. 2s. and on exportation, draw back 88 l. 11 s. For the whale-fins, train oil, and blubber of whales, caught in the Greenland Seas, or St. David's Straights, or any parts of the ſeas adjoining, &c. See the article OIL.

WHARF, a ſpace on the banks of a haven, creek, or hithe, provided for the convenient loading and unloading of veſſels upon. See HAVEN, HITHE, &c.

The fee paid for the landing of goods on a wharf, or for ſhipping them off, is called wharfage, and the perſon who has the direction and overſight of the wharf, receives wharfage, &c. is called the wharfinger. See the article KEY.

WHEAT, *triticum*, in botany. See the article TRITICUM.

It has been very juſtly obſerved by the antients, as well as moderns, that wheat will grow in almoſt any part of the world, and that, as it is the plant moſt neceſſary to mankind, ſo it is the moſt general and the moſt fruitful. It grows well not only in the temperate climates, but in the very hot and very cold ones; and when ſown in places where it never grew ſpontaneouſly, ſucceeds as well as where it has been always common.

Mr. Tull obſerves, that when wheat is planted early, leſs ſeed is required to an acre than when it is planted late, becauſe leſs of it will die; and poor land ſhould always be allowed more ſeed than rich, becauſe a greater number of the plants will periſh on this land than on the other. The leaſt quantity yet of ſeed is neceſſary for rich land, that is planted early: for in this caſe very few of the ſeeds will fail to produce a plant that will live and flouriſh. The uſe of the hoe cauſes every plant to ſend out a great number of ſtalks from the ſame root; and in theſe, more than in the number of plants, conſiſts the richneſs of a crop, as the ears on theſe are always largeſt and fulleſt. See HOEING and HUSBANDRY.

Another thing to be conſidered, in order to find the proper quantity of ſeed to plant, is, that ſome wheat of the ſame ſpecies has its grains twice as large as others: in this caſe, a buſhel containing but half the number of grains that it does in the ſmall grained wheat, one buſhel of the ſmall-grained will plant juſt as much as two buſhels of this; not the meaſure of the ſeeds, but the number of the grains being the thing to be conſidered in regard to the ſowing.

It is a very natural thing to ſuppoſe that a large-grained wheat will produce larger and finer plants, and larger grain than a ſmall-grained one; but experiments have proved, that there is nothing in this; for the ſmalleſt-grained wheat produces fully as large plants as the

largeſt, and thoſe with as great ears, and as big ſeeds; but the young plants appear ſmaller and poorer. Six gallons of middle-ſized ſeed is the uſual quantity drilled upon an acre; but on rich lands, planted early, four gallons will ſuffice; becauſe then the wheat will have roots at the top of the ground before winter, and tiller very much, without danger of the worms, and many other accidents, which the late planted wheat is liable to. If it be drilled too thin, it will be in danger of falling, and if too thick, it may happen to tiller ſo late in the ſpring, that ſome of the ears may be blighted; a medium therefore is beſt. See the article DRILLING.

The depth to plant it at, is from half an inch to three inches; for if planted too deep, there is more danger of its being eaten off by worms between the grain and the blade. A wheat-plant that was not ſown early, ſends out no root above the grain, before the ſpring, and is nouriſhed all the winter by a ſingle thread, proceeding from the grain up to the ſurface of the ground: this is the thread of life to the plant during the winter, and the longer that is, the greater danger there is of the worm, that creature much more eaſily finding a thread that extends by its length to five or ſix inches deep, than one which reaches but one inch; beſide, the worms in winter do not inhabit very near the ſurface of the ground, and therefore they never naturally come in the way of the ſhort threads, though the long ones are always in their reach.

It is very neceſſary to take care againſt the rooks, juſt at the time when the wheat is ſhooting up. Theſe miſchievous birds perceiving it beginning to ſprout, before the farmer can ſee any thing of it, and are led by the ſhoot to pick it up; they muſt be careſully kept off the ground for a week or ten days at this ſeaſon; for at the end of that time the blade will be grown up, and the grain ſo exhauſted of its flour, that it will be of no value to them, nor will they give themſelves any trouble about ſtealing it.

There are four ways of augmenting the crops of wheat not only in the number of the plants, but in the ſtalks, ears, and grains. The firſt is by increaſing the number of ſtalks from one, two, or three, to thirty or forty in each plant, in ordinary field land; and the crop is augmented by bringing up all theſe ſtalks into ear, which is the ſecond way; for if it be diligently obſerved, it will be found that not one half of the ſtalks of wheat, ſown in the common way, ever come to ear at all: nay, if a ſquare yard of ſown-wheat be marked out, and the ſtalks thereon numbered in the ſpring, it will be found that no leſs than nine parts in ten of them are wanting at the harveſt-time.

An experiment of the advantage of this augmentation was made by Mr. Tull in rows of wheat that were equally poor; one of theſe rows was increaſed ſo much, as to produce more grains than ten of the other, by bringing up more of its ſtalks into ears; and alſo by augmenting the ears to a much greater bigneſs, which is the third way: for it very certain that the ears will be much larger or much ſmaller, according to the quantity of nouriſhment that is given them.

The fourth and laſt way of increaſing the crops of wheat, is by cauſing the grain to be much larger in the ears. This can no way be done ſo effectually as by late hoeing, eſpecially if it be done juſt after the wheat is gone out of the bloſſom; by this means the grains will weigh twice as much as thoſe produced in the ſame ſort of wheat, when this late hoeing has been omitted; their number, at the ſame time, is the ſame in the ear; and as the wheat is ſold not by tale, but by meaſure, the farmer's gain is double in this caſe; the wheat meaſuring juſt twice as much as it would otherwiſe have done.

Thus, by increaſing the number of the ſtalks, bringing more of them up into the ear, making the ears larger, and the grains larger, plumper, and fuller in every ear; the method of horſe-hoeing, by which alone this can be effected, makes a larger crop out of the tenth part of the number of plants, than in the common way: but all theſe advantages will be loſt by thoſe who, though they give into the horſe-hoeing-way, yet will not allow the ſix feet intervals between the rows; for it is owing to this great ſpace of ground alone, that as much nouriſhment may be given to the wheat as the farmer pleaſes.

Poor light land, in the common way of huſbandry, muſt be extremely well manured, in order to the maintaining wheat a year, which is the uſual time that it is in it; and if it be ſown late, the greater part of it uſually periſhes, not being able to ſurvive the winter while ſo poor, and

and on ſuch land; and if it be ſown very early on ſtrong land, though rich, well tilled, and dunged, the crop will be worſe than on poor light land ſown early. The new method of horſe-hoeing gives both to ſtrong and to light land all the advantages neceſſary, and takes off all the diſadvantages of both. By this method the ſtrong land may be planted with wheat as early as the light, if plowed dry; and the hoe-plough, if rightly applied, will be able to give it nouriſhment equal to that of dung in both ſorts of land.

The tops of the ridges for the drilling of wheat muſt not be left quite ſo narrow and ſharp as they are for drilling of turneps; wheat being generally to be ſowed in treble rows, and the turnep only in ſingle ones. In reaping the wheat thus ſown, it is to be cut as near to the ground as poſſible, and this is eaſier done in this than in wheat ſown in the common way, becauſe in this drilled method the ſtalks all ſtand cloſe together. When the wheat is cut thus low in the reaping, the ſtubble is no great impediment to the preparing the land for the ſucceeding crops.

As ſoon as conveniently may be, after the carrying off a crop of wheat, if the trench in the middle of each wide interval be left deep enough by the laſt hoeing, the farmer is to go as near as he can to the ſtubble with a common plough, and turn two large furrows into the middle of the intervals which will make a ridge over the place where the trench was; but if the trench be not deep enough, it is beſt to go firſt in the middle of it with one furrow; this, with two more taken from the ridges, will be three furrows, in each interval; this plowing is to be continued as long as the dry weather laſts, and then the whole is to be finiſhed by turning the partitions on which the laſt wheat grew up to the new ridges, which is uſually done at two great furrows; theſe laſt furrows, which complete the ridges, may be plowed in wet weather. By this ſort of management, the wheat being planted in rows, at ſix feet intervals, the ſame piece of ground will produce every year a new crop of wheat in the intervals, without any fallowing or manure, only by means of the ſufficiently breaking the ſurface with plowing and horſe-hoeing.

Buck WHEAT. This is a plant very advantageous to the farmers of England, who have barren lands in poſſeſſion. It is to be ſown in May. One buſhel of ſeed will ſow an acre, and it will grow on any ſoil. It ripens late in autumn, and, when mowed, it muſt lie upon the ground till the ſtalks, which are naturally hard, grow ſoft; it will not ſhed the ſeed in lying, nor will it get any damage by the rain. It yields a very conſiderable increaſe, and if the land be tolerable, ſometimes no leſs than fifty or ſixty buſhels from an acre.

It is excellent food for hogs, poultry, and other animals. The flour of it is very white, and, mixed with wheat-flour, is uſed for food by the country people in ſome places. The ſtraw is good fodder for cattle, and the grain is good to give to horſes among their oats; but it muſt be broken in a mill, otherwiſe it will paſs through them whole.

White-Cone WHEAT, a term uſed by our huſbandmen to expreſs a peculiar kind of wheat, which is very ſtrong, and has a large ear.

It is the beſt kind for ſowing in fields ſubject to the blight; for the ſtalks of it being, for the moſt part, ſolid or full of pith like a ruſh, not hollow like thoſe of common wheat; the inſects that cauſe the blight ſeizing on the ſtalks of other wheat, does this no injury, even though they ſhould attack it; the ſtalks of this kind being often found full of black ſpecks, which are always the marks of that inſect having been there, and yet the ear full, and the grain good.

This wheat makes very good bread, if the miller does not grind it too ſmall, or the baker make his dough too hard; it requiring to be ſomewhat larger than other wheat-flour, and ſomewhat ſofter in the dough. A buſhel of white-cone-wheat will make conſiderably more bread than a buſhel of lammas wheat; but it gives it ſomewhat a yellowiſh caſt.

Smyrna-WHEAT, a peculiar kind of wheat that has an extremely large ear, with many leſſer or collateral ears coming all round the bottom of the great one.

As this is the largeſt of all ſorts of wheat, ſo it will diſpenſe with the nouriſhment of a garden, without being overfed, and requires more nouriſhment than common huſbandry in the large way can give it. In the common way its ears grow not much larger than thoſe of our common wheat.

This

This ſort of wheat ſeems, of all others, the moſt proper for the new method of horſe-hoeing huſbandry, as that method ſeems capable of giving as much nouriſhment as the farmer pleaſes, by often repeating the hoeing. Next to this, the white-cone wheat is beſt for this ſort of huſbandry; then the grey-cone wheat.

WHEAT, a common article of our food, is more glutinous and nutritious than moſt other kinds of grain. The flour, or the ſtarch, prepared from it, form with water a ſoft viſcid ſubſtance, which has been taken with good ſucceſs in diarrhœas and dyſenteries. Bran contains, beſides the huſks or ſhells of the wheat, a portion of farinaceous matter: this is leſs glutinous than the finer flour, and is ſuppoſed to have a detergent quality. See BRAN.

For the bounties upon wheat, ſee CORN.

For the manner of preſerving wheat, ſee the articles CORN and GRANARY.

For the manner of grinding, *&c.* wheat, ſee GRINDING, MILL, FLOUR, *&c.*

WHEAT-EAR, in ornithology, the engliſh name of a ſpecies of motacilla, with a grey, black, and white forehead. See MOTACILLA.

WHEEL, *rota*, in mechanics, a ſimple machine, conſiſting of a round piece of wood, metal, or other matter, which revolves on an axis. The wheel is one of the principal mechanic powers: it has place in moſt engines; in effect, it is of an aſſemblage of wheels that moſt of our engines are compoſed. For the theory of this mechanic power, called axis and wheel, ſee AXIS *in peritrochio*.

For the theory of clock-wheels, watch-wheels, mill-wheels, *&c.* ſee the articles CLOCK, MILL, *&c.*

With regard to the wheels of coaches, waggons, *&c.* otherwiſe called wheel-carriages, the whole doctrine thereof may be reduced to the following particulars; *viz.* 1. Wheel-carriages meet with leſs reſiſtance then any other. 2. The larger the wheel the eaſier is the draught of the carriage. 3. A carriage upon four wheels of equal ſize, is drawn with leſs force than with two of thoſe wheels and two of a leſſer ſize. 4. If the load be laid on the axle of the larger wheels, it will be drawn with leſs force than if it had laid on the axis of the leſſer wheels, contrary to the common notion of loading carriages before. 5. The carriage goes with much leſs force on friction-wheels than in the common way: all which will be confirmed by experiments. The wheels of carriages muſt be exactly round, and the fellies ſhould be at right angles to the naves, according to the inclination of the ſpokes: that is, the plane of the curvature of the wheel ſhould cut the nave at right angles, though it need not paſs through the ſpace where the ſpokes are inſerted into the nave.

1. It is a general rule in all caſes that the wheels be exactly round; for if they were not ſo, but like EFGH (plate CCC. fig. 1.) and the nave out of the center, it is certain, that ſuch a wheel, in turning, would be affected in the ſame manner upon plane ground as other wheels are when they riſe and fall, and would not be in equilibrio; the wheel turning towards H would move with as much difficulty as if there was a riſe to aſcend; and that height being paſſed, it would fall on a ſudden, as if a ſquare ſtone was rolled along, and the jolts of the wheel would precipitate and puſh the horſes at one time, and immediately increaſe their difficulty of drawing the next moment; and that in proportion to the wheels being out of round: yet if the nave ſhould not be in the middle, the ſhorteſt part, as F, being on the ground; when ſuch a wheel begins to turn, the weight muſt be raiſed in the ſame manner as when another carriage is going up an hill: and from F to D, or quite to G, the wheel would act like a wedge: and at D, or G, it would fall and drive on the horſes as in a ſteep deſcent.

2. The fellies muſt not croſs wind, but be at right angles with the naves, according to the inclination of the ſpokes; for otherwiſe the wheel in turning would find inequalities, as it happens when the hole of the nave is too big, and the wheel moves from ſide to ſide; which comes to the ſame purpoſe as if the wheel was out of round; and then the inequality of the ſpokes, which would be too leaning or too ſtrait, upon the nave deſcending into an hole, or riſing upon an eminence, oppoſite to their inclination, would cauſe them, or the fellies, to break.

3. The ſpokes muſt be inclined to the naves, that the wheels may be diſhing or concave. If the wheels always turned upon ſmooth and even ground, it is certain that the ſpokes ought to be ſtraight upon the naves; that is, at right angles to their axes, becauſe then they would bear perpendicularly, like the ſpoke B, (*ibid.* fig.

WHEEL-CARRIAGES.

Fig. 1.

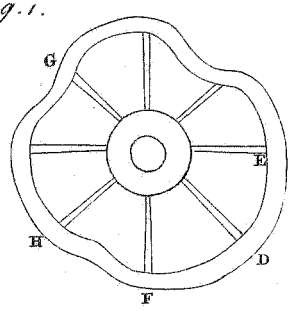


Fig. 6.

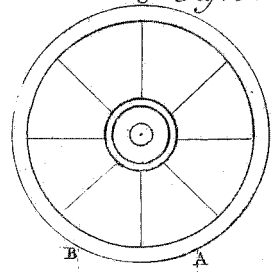


Fig. 2.

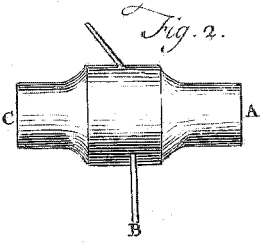


Fig. 7.

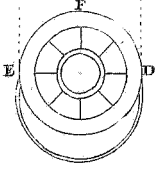


Fig. 3.

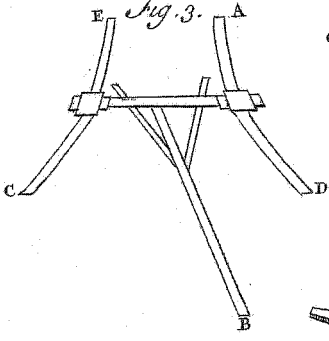


Fig. 8.

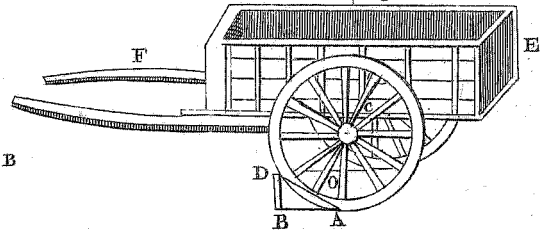


Fig. 4.

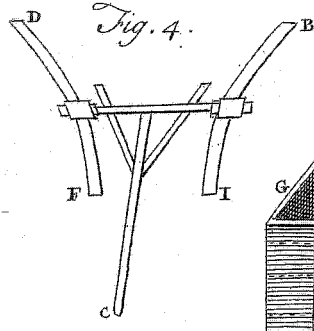


Fig. 9.

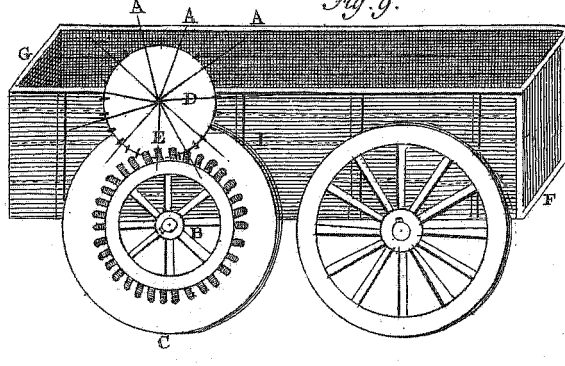


Fig. 5.

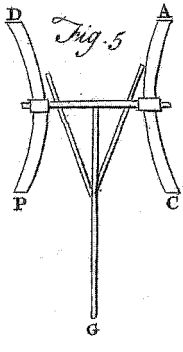


Fig. 10.

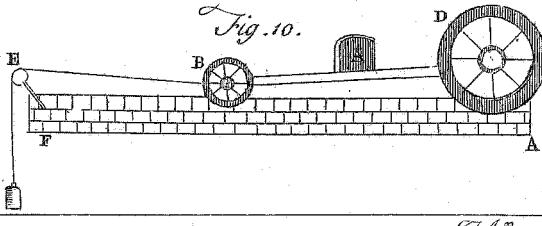


fig. 2.) of the nave AC, which is the ſtrongeſt way for wood. But becauſe the ground is unequal, and when the wheels fall into the ruts, that wheel which is in the rut bears a greater part of the weight than the other, becauſe it is lower: in ſuch a caſe the ſpokes of a diſhing-wheel become perpendicular in the rut, and therefore have the greateſt ſtrength; whilſt the oppoſite wheel, being upon higher ground, bears a leſs part of the weight; and, conſequently, the ſpokes need not be at their full ſtrength, and ſo will have a ſufficient force, though that force be leſs than what they have upon even ground.

4. The axle-tree muſt be ſtreight in all reſpects, and at right angles to the ſhafts or to the pole. In the motion of all bodies there is one way of moving which is the eaſieſt of all the reſt, and happens here when the axle-tree is every way ſtraight; for if its ends ſhould bend backwards, ſo as to bring the wheels nearer together behind, as AE, *ibid.* fig. 3. and ſpread them much before, as DC, it is certain that they could not go into the ruts, nor turn in going forward, or at leaſt with great difficulty, dragging inſtead of rolling. There would be the ſame inconveniences in bending the axle-tree forward, ſo as to bring them nearer the pole as IF, fig. 4. and make them ſpread behind, as at BD. The leſs the axle-tree is bent, the leſs the inconveniency: but there will always be ſome, when the wheels are not parallel; and there will be no inconveniency when the axle is ſtraight, and the wheels are in the ſituation CP and AD, fig. 5. The axle muſt alſo be at right angles to the pole or ſhaft; for if the pole or ſhafts were on one ſide, as at B, fig. 3. or C, fig. 4. the coach or carriage would be drawn on one ſide, and almoſt all the weight would bear upon one horſe; but it muſt be at right angles like the pole G, fig. 5.

5. Great wheels are always more advantageous for rolling than little ones, in any caſe, or upon any ground whatſoever. The wheels of carriages are conſidered according to the velocity and friction they have upon the axle-tree, and likewiſe according to their reſiſtance, or ſinking in upon the ground. If we conſider them according to the friction, it is certain, that a wheel whoſe diameter is double that of another, will make but one turn, whilſt the little one makes two for the ſame length of way; the circumference, which is in proportion to the diameter, being double. Therefore, in reſpect to friction, a wheel of double the diameter will have a double advantage, there being but one turn inſtead of two, which doubles the friction in the ſmall wheel. The wheel ABC, being twice as big as the wheel DEF, (*ibid.* fig. 6. and 7.) will have twice the advantage in reſpect of the friction, the holes of the nave and the axles being equal. See the articles FRICTION, CIRCUMFERENCE, *&c.*

If we conſider the wheels according as they ſink into the earth, or fall into holes, there will be the ſame advantage for the one and inconveniency for the other. If we conſider the bearing, it is double in the great wheel; therefore it will ſink but half the way: and if we conſider hollows, it will give the ſame advantage in ſome caſes; but then in others, as, for example, where the holes are deep, the little wheel will have much more diſadvantage: for if it ſhould fall into a great hole, as DE, fig, 6, 7, and 8. of a diameter, equal to that of the wheel, it would wholly ſink in whilſt the great wheel would only fall in the depth of its ſegment AB, which would not be half the wheel, as may be ſeen from the parallel lines AD and BE. We may ſuppoſe the ſame to happen in marſhy grounds, where a little wheel would ſink wholly in the ſame hole that the great one would ſink but in part. EF, *ibid.* fig. 8. is a cart, or carriage: BD a rub for the wheel CAD to paſs over, AB the horizontal plane; DB, AC, perpendicular, and OD parallel, to AB, C the centre of the wheel. Then the horizontal force required to pull the wheel over the rub BD, is as $\frac{DO}{CO}$ and the difficulty of going over rubs increaſes in a greater ratio than that of their heights. Alſo the higher the wheels, the more eaſily they paſs over them; but then they are the more apt to to overturn.

To draw the cart with the leaſt power over the rub BD, it ſhould not be drawn in the horizontal direction AB or OD, but in the direction AD. The advantage then of high wheels is, that they paſs the rubs moſt eaſily, have the leſs friction, ſink leſs in the dirt, and more eaſily preſs down an obſtacle: and their diſadvantage is, that they eaſily overturn, and make cattle draw too high; for they can apply their ſtrength beſt when

when they draw low and upwards in the direction AD, which is the advantage of low wheels: yet if the wheels are high they may be made to draw low, by fixing the limmers or traces as far below the axle as you will, which will then be an equal advantage with low wheels. For the power not pulling at the wheel, but at the carriage, may draw from any part of it. There is another advantage in ſmall wheels, which is, that they are better to turn with. A waggon with four wheels is more advantageous than a cart with two wheels, eſpecially on ſand, clay, *&c.* Narrow wheels and narrow plates are a diſadvantage.

Suppoſe the waggon FG, fig. 9. is moved forward by a power acting within it, which power turns the wheel DE by the ſpokes AD, AD, *&c.* and DE turns the wheel IC, which carries the waggon. Let the power at A be 1, then the force acting at E will be $\frac{DA}{DE}$: alſo, if the power at E be 1, the force at C, by which the waggon is moved, will be $\frac{BE}{BC}$: therefore the power at A, to the force with which the waggon can be moved, is as 1 to $\frac{DA \times BE}{DE \times BC}$; or the power is to that force, as $DE \times BC$, to $DA \times BE$. It will be the ſame thing if, inſtead of teeth, the wheel DE carries EB by a chain going round them. You muſt ſuppoſe the like wheels on the oppoſite ſide. Hence, if the abſolute force to move the waggon without, be 1, the force within applied at A to move it will be $\frac{DE \times BC}{BE \times DA}$.

6. It would be much more advantageous to make the four wheels of a coach or waggon large, and nearly of a height, than to make the fore wheels of only half the diameter of the hind wheels, as is uſual in many places, which the following experiment will confirm.

Let us make uſe of a little waggon, or model, of an inch to a foot (repreſented *ibid.* fig. 10.) with the four wheels of five inches and nine lines; and ſo contrived that one may put on wheels of different diameters: as, for example, four of five inches, two of two inches three lines, two others of three inches, and let them have naves, ſpokes, and fellies, in proportion, to repreſent the wheels of a coach or waggon: let them be changed one after another, the waggon DB being always loaded with the ſame weight, A, of five pounds, and drawn by means of a ſilken thread running over a pulley, with a little bag, or ſcale of a ballance, to put in balls for the different wheels, according as they are to run upon even ground, upon earth, ſand, or pavement. The board AF muſt be of oak, three feet long, plained on one ſide, and carved on the other, to imitate the pavements and the channels of ſtreets. The paving-ſtones muſt be of ſeven or eight lines inſtead of ſeven or eight inches, reducing them from inches to lines, as the wheels are reduced from feet to inches. It muſt be ſo contrived that the pulley may be turned to either ſide of the board. The whole being ſo diſpoſed, the ſeveral experiments will anſwer a table, for which we refer the reader to Deſagulier's Courſe of Experimental Philoſophy, vol. i. page 223.

WHEEL is alſo the name of a kind of puniſhment which great criminals are put to in divers countries. In France, their aſſaſſins, parricides, and robbers on the highway, are condemned to the wheel; *i. e.* to have their bones firſt broken with an iron-bar on a ſcaffold, and then to be expoſed and left to expire on the circumference of a wheel. In Germany they break their bones on the wheel itſelf.

WHEEL, in the military art, is the word of command, when a battalion or ſquadron is to alter its front either one way or the other. To wheel to the right, directs the man in the right angle to turn very ſlowly, and every one to wheel from the left to the right, regarding him as their center; and *vice verſa*, when they are to wheel to the left. When a diviſion of men are on the march, if the word be to wheel to the right or to the left, then the right or left hand man keeps his ground; only turning on his heel, and the reſt of the rank move about quick till they make an even line with the ſaid right or left hand man.

WHEEL-ANIMALS, *brachionus*, a genus of animalcules which have an apparatus of arms for taking their prey. This apparatus has been ſuppoſed, by microſcopical writers, to be a kind of wheels; and thence named the creatures that are poſſeſſed of it wheel-animals.

This is one of the ſmaller animalcules; and is, by Dr. Hill, deſcribed to be, when in a ſtate of reſt, of a plain ſmooth body,

body, of a conic figure, obtuſe at the poſterior extremity, and open at the anterior, of a duſky olive colour, and ſemitranſparent. When it puts itſelf in motion, it protrudes, from the open extremity, a part of its naked body; to the whole of which this outer conic body ſeems to be but a caſe, or ſheath; from the extremity of this exerted part of the body, the creature ſoon after thruſts out two protuberances, which give it the appearance of a double head; and in each of theſe is diſcovered an apparatus in a continual motion, appearing a rotatory one, but in reality a vibratory one very quick repeated. Each of theſe protruded bodies has ſix arms inſerted into it, and theſe it continually ſhuts and opens over one another. Each of theſe arms is furniſhed with a double ſeries of fibres at its edge, which being expanded cauſe it to ſpread to a conſiderable breadth. There are ſeveral ſpecies of this genus of animalcules.

WHETSTONE, *cos*, a ſtone which ſerves for the whetting of knives and other tools upon. See Cos.

WHEY, the ſerum, or watry part, of milk. See the article Milk.

WHIFFLER of a company, in London, a young freeman who goes before, and waits on the company on public ſolemnities.

WHIG, a party in England, oppoſite to the tories, from whom they differ chiefly in their political principles. See Tories. The names of whig and tory were not known till about the middle of the reign of Charles II. when theſe were given as party diſtinctions. Theſe parties may be conſidered either with regard to the ſtate, or to religion. The ſtate tories are either violent or moderate: the firſt would have the king to be abſolute, and therefore plead for paſſive obedience, non-reſiſtance, and the hereditary right of the houſe of Steuart. The moderate tories would not ſuffer the king to loſe any of his prerogative; but then they would not ſacrifice thoſe of the people. The ſtate whigs are either ſtrong republicans or moderate ones. The firſt, ſays Rapin, are the remains of the party of the long parliament, who attempted to change the monarchy to a commonwealth: but theſe make ſo ſlender a figure, that they only ſerve to ſtrengthen the party of the other whigs. The tories would perſuade the world, that all the whigs are of this kind; as the whigs would make us believe that all the tories are violent. The moderate ſtate whigs are much in the ſame ſentiments with the moderate tories, and deſire that the government may be maintained on the antient foundation: all the difference is, that the firſt bear a little more to the parliament and people, and the latter to that of the king. In ſhort, the old whigs were always jealous of the incroachments of the royal prerogative, and watchful over the preſervation of the liberties and properties of the people. In regard to religion, the whigs have always been for limiting the power of the biſhops, and aboliſhing the convocation.

WHINE, an hunting term, uſed for the cry of an otter.

WHIP, or WHIP-STAFF, in a ſhip, a piece of timber, in form of a ſtrong ſtaff, faſtened into the helm, for the ſteerſman, in ſmall ſhips, to hold in his hand, in order to move the rudder and direct the ſhip.

Whip-grafting. See Grafting.

WHIPPING, in angling, is the faſtening a line to the hook or to the rod. It is alſo uſed for the caſting in of the hook, and drawing it gently on the water.

WHIPT SYLLABUB. See Syllabub.

WHIRL-POOL, an eddy, vortex, or gulph, where the water is continually turning round. See the articles Gulph, Eddy, Vortex, *&c.*

Theſe in rivers are very common, from various accidents, and are uſually very trivial, and of little conſequence. In the ſea they are more rare, but more dangerous. Sibbald has related the effects of a very remarkable marine whirlpool among the Orcades, which would prove very dangerous to ſtrangers, though it is of no conſequence to the people who are uſed to it. This is not fixed to any particular place, but appears in various parts of the limits of the ſea among thoſe iſlands. Wherever it appears it is very furious; and boats, *&c.* would inevitably be drawn in and periſh with it; but the people who navigate them are prepared for it, and always carry an empty veſſel, a log of wood, or large bundle of ſtraw, or ſome ſuch thing, in the boat with them; as ſoon as they perceive the whirlpool, they toſs this within its vortex, keeping themſelves out: this ſubſtance, whatever it be, is immediately received into the centre and carried under water; and as ſoon as this is done, the

ſurface of the place where the whirpool was becomes ſmooth, and they row over it with ſafety; and in about an hour they ſee the vortex begin again in ſome other place, uſually at about a mile diſtance from the firſt.

WHIRL-WIND, a wind that riſes ſuddenly, is exceeding rapid and impetuous when riſen, but is ſoon ſpent. See the articles WIND and HURRICANE.

There are divers ſorts of whirl-winds, diſtinguiſhed by their peculiar names; as the preſter, typho, turbo, exhydria, and ecnephias. The preſter is a violent wind, breaking forth with flaſhes of lightning. This is rarely obſerved; ſcarce ever without the ecnephias. Seneca ſays it is a typho or turbo kindled or ignited in the air. See the article PRESTER.

The ecnephias is a ſudden and impetuous wind, breaking out of ſome cloud, frequent in the Ethiopic-ſea, particularly about the cape of Good Hope. The ſeamen call them travados. The exhydria is a wind burſting out of a cloud with a great quantity of water. This only ſeems to differ in degree from the ecnephias, which is frequently attended with ſhowers. A typho, or vortex, moſt properly called whirl-wind, or hurricane, is an impetuous wind, turning rapidly every way, and ſweeping all round the place. It uſually deſcends from on high. It is frequent in the Eaſtern-ocean, chiefly about Siam, China, &c. and renders the navigation of thoſe parts exceeding dangerous. See the articles VORTEX, SPOUT, &c.

WHISPERING. See the articles HEARING, ATTENTION, &c.

WHISPERING-PLACES depend upon this principle. If the vibrations of the tremulous body are propagated through a long tube, they will be continually reverberated from the ſides of the tube into its axis, and by that means prevented from ſpreading, till they get out of it; whereby they will be exceedingly increaſed, and the ſound rendered much louder than it would otherwiſe be. See the article SOUND.

Hence it is, that ſound is conveyed from one ſide of a whiſpering-gallery to the oppoſite one, without being perceived by thoſe who ſtand in the middle. The form of a whiſpering-gallery is that of a ſegment of a ſphere, or the like arched figure; and the progreſs of the ſound through it may be illuſtrated in the following manner: Let ABC (plate CCXCVII. fig. 4.) repreſent the ſegment of a ſphere; and ſuppoſe a low voice uttered at D, the vibrations expanding themſelves every way, ſome will impinge upon the points E, E, &c. and from thence be reflected to the points F, from thence to G, and ſo on till they all meet in C, and, by their union there, cauſe a much ſtronger ſound than in any part of the ſegment whatever, even at D, the point from whence they came. Accordingly, all the contrivance in whiſpering places is, that near the perſon who whiſpers there may be a ſmooth wall, arched either cylindrically or elliptically. A circular arch will do, but not ſo well. See ARCH, ECHO, PHONICS, &c.

The moſt conſiderable whiſpering places in England are, the whiſpering-gallery in the dome of St. Paul's, London, where the ticking of a watch may be heard from ſide to ſide, and a very eaſy whiſper be ſent all round the dome. The famous whiſpering place in Glouceſter cathedral, is no other than a gallery above the eaſt end of the choir, leading from one ſide thereof to the other. It conſiſts of five angles and ſix ſides, the middlemoſt of which is a naked window, yet two whiſperers hear each other at the diſtance of twenty-five yards.

WHIST, a well-known game at cards; ſo called from the ſilence obſerved during the play, which is like that of honours and ruff. See HONOURS *and ruff*.

However, as there are many ways of cheating practiſed at this game, we ſhall only mention a few, to put the unwary upon their guard. Some by winking, ſhutting their eyes, placing their fingers, or other ſigns, find means to let their partners know what honours they have got: others have a way of cutting honours either to their partners or themſelves: the dealer is often crafty enough to conceal ſome honours for himſelf: but the beſt way of rooking is by means of breef-cards; for all the honours being ſomewhat broader than the reſt, your adverſary muſt always cut you an honour.

WHISTLE-FISH, the cirrated gadus, with a furrow at the firſt back fin, being a ſmall ſpecies, uſually about eight inches long, and its thickneſs not great in proportion. See the article GADUS.

WHITBY, a port-town of the north riding of Yorkſhire, ſituated on the German ſea, thirty-eight miles north-eaſt of York.

WHITCHURCH, a borough-town of Hampſhire, ſituated ten miles north of Wincheſter.

It ſends two members to parliament.

WHITE, one of the colours of natural bodies. See COLOUR.

White is not ſo properly ſaid to be any one colour, as a compoſition of all colours; for it is demonſtrated by Sir Iſaac Newton, that thoſe bodies only appear white, which reflect all the kinds of coloured rays alike. See WHITENESS.

WHITE, in painting in miniature, *&c.* The beſt white for painting in water-colours, is flake white, which is better than white lead; and if it be pure, far exceeds it in beauty; becauſe white lead is apt to turn blackiſh, eſpecially if it be uſed in a hard water: but if you uſe white lead, firſt rectify it with white wine vinegar in the following manner: grind well the fineſt white lead upon a porphery with vinegar; then put it into a glaſs of water, ſtir it about, and preſently pour off the water, while it is white, into ſome other clean glaſs or veſſel; let it ſettle, and then pour off the water from it, and it will be exceeding fine. When this white is ſettled put to it gum-water, to bind it and give it a glaze.

Some recommend a white made of the whiter part of oiſter-ſhells, reduced into an impalpable powder; this is called pearl-white, and will mix with any colour. Some alſo recommend the powder of egg ſhells of the brighteſt colour, and well cleaned and waſhed, ground with gum-water, to which may be added about a twentieth part of white ſugar-candy: the egg-ſhells ſhould be ground to an impalpable powder. Experience proves, that egg-ſhell powder is of very great ſervice as a white in water-colours, and both that and the powder of oiſter-ſhells, well rectified and mixed with the white of an egg well beaten, will make an extraordinary mixture in other colours, and will correct them from changing or altering their qualities.

WHITE *of the eye*, denotes the firſt tunic or coat of the eye, called albuginea and conjunctiva, becauſe it ſerves to bind together, or incloſe, the reſt. See EYE.

WHITE-FRIARS, a name common to ſeveral orders of monks, from their being clothed in a white habit. See MONK.

WHITE-HART *ſilver*, a mulct or tribute paid into the exchequer, out of certain lands in or near the foreſt of White-hart in Dorſetſhire; impoſed by Henry III. upon Thomas de la Linde, for killing a beautiful white hart which that prince had before ſpared in hunting.

WHITE-HORSE, in ichthyology, the prickly backed raia, with two ſeries of prickles on the tail, and one ſeries over each eye. See the article RAIA.

This is a ſingular ſpecies, the body is conſiderably broad in proportion to its length, but it is alſo thick; the back is ſomewhat gibboſe, but the belly is more flat; the roſtrum is oblong and acute, the eyes are prominent, and there is an aperture behind each; the mouth is tranſverſe and large, and furniſhed with a number of ſharp teeth; the apertures of the gills run down from it on each ſide along the breaſt, they are ſmall, and there are five of them on each ſide.

WHITE LEAD, alſo called ceruſe. See the article CERUSE.

WHITE-LINE, among printers, a void ſpace of the depth or breadth of a line. See the article PRINTING.

WHITE MEATS, include milk, butter, cheeſe, white-pots, cuſtards, and other kinds of food made of milk or eggs. Some alſo add chickens, veal, and fiſh.

WHITE-POT, milk or cream beat up with the yolks of eggs, mixed with ſugar and ſpice, and baked in an earthen diſh, with ſlices of bread in it.

The cooks furniſh us with a variety of diſhes under this denomination; as the rice white-pot, Weſtminſter white-pot, Norfolk white-pot, *&c.*

WHITE RENT, a rent or duty of 8 d. paid annually by every tinner in the county of Devon, to the duke of Cornwall.

WHITE-SEA, in geography, a bay of the frozen ocean, in the north of Muſcovy, between ruſſian Lapland, and Samoieda.

Spaniſh-WHITE, a kind of fucus uſed by ladies to heighten the complexion, and hide its defects.

It is made of tin-glaſs diſſolved in ſpirit of nitre, and precipitated into a very fine powder by means of ſalt-water.

WHITE-WINE, wine of a bright tranſparent colour, bordering on white, thus called to diſtinguiſh it from the red wines. See WINE.

The generality of white-wines are made from white grapes; though there are ſome from black ones, only the ſkins are kept from tinging them.

WHITEHAVEN, a port-town of Cumberland, ſituated on the Iriſh chann l: weſt long. 3° 16′, north lat. 54° 30′.

WHITENESS, *albedo*, the quality which denominates a body white. See the articles WHITE and COLOUR.

Sir Iſaac Newton ſhews, that whiteneſs conſiſts in a mixture of all the colours; and that the light of the ſun is only white, becauſe conſiſting of rays of all colours. See the article RAY.

From the multitude of rings of colours which appear upon compreſſing two priſms or object-glaſſes of teleſcopes together, it is manifeſt that theſe do ſo interfere and mingle with one another at laſt, as, after eight or nine reflections, to dilute one another wholly, and conſtitute an even and uniform whiteneſs; whence, as well as from other experiments, it appears, that whiteneſs is certainly a mixture of all colours, and that the light which conveys it to the eye, is a mixture of rays endued with all thoſe colours. See the article LIGHT.

The ſame author ſhews, that whiteneſs, if it be moſt ſtrong and luminous, is to be reckoned of the firſt order of colours; but if leſs, as a mixture of the colours of ſeveral orders. Of the former ſort he reckons white metals, and of the laſter, the whiteneſs of froth, paper, linnen, and moſt other white ſubſtances. And as the white of the firſt order is the ſtrongeſt that can be made by plates of tranſparent ſubſtances, ſo it ought to be ſtronger in the denſer ſubſtances of metals than in the rarer ones of air, water, and glaſs. Gold or copper mixed either by fuſion, or amalgamation with a very little mercury, with ſilver, tin, or regulus of antimony, becomes white, which ſhews both that the particles of white metals have much more ſurface, and therefore are ſmaller than thoſe of gold and copper; and alſo that they are ſo opake, as not to ſuffer the particles of gold or copper to ſhine through them. And as that author doubts not but that the colours of gold and copper are of the ſecond and third order, therefore the particles of white metals cannot be much bigger than is requiſite to make them reflect the white of the firſt order. See PARTICLE.

WHITING, in ichthyology, the engliſh name for the white gadus with no beard, and with three fins on the back, and the upper jaw longeſt. See GADUS.

The head and body of this ſpecies is compreſſed, the back is convex, the anus is at a great diſtance from the tail, and is, indeed, very near the head; the colour of the whole fiſh is a ſilvery white, except that on the back there is an admixture of a blackiſh tinge; the ſcales are very ſmall, roundiſh and white; the noſtrils have each a double aperture, and are placed high; the eyes are very large, the iris ſilvery, and the pupil large and blue; the teeth are very numerous; the pectoral fins have each twenty ones rays, and the ventral fins have each ſix rays; the pinnæ ani are two, and have, the firſt thirty-three, and the ſecond twenty-two rays. This ſpecies is frequent in our ſeas, and much eſteemed at our tables.

WHITING-POLLOCK, in ichthyology, a ſpecies of gadus with three back fins, the lower jaw longeſt, and the lateral line crooked. See GADUS.

The uſual length of this fiſh is from eight to thirteen inches; it is conſiderably thick in proportion, and in moſt other reſpects reſembles the common whiting.

WHITES, in medicine, the ſame with fluor albus. See FLUOR ALBUS.

WHITLOW, in medicine. See the article PARONYCHIA.

WHITSUNDAY, a ſolemn feſtival of the chriſtian church, obſerved on the fiftieth day after Eaſter, in memory of the deſcent of the Holy Ghoſt upon the apoſtles in the viſible appearance of fiery cloven tongues, and of thoſe miraculous powers which were then conferred upon them.

It is called Whitſunday, or White-ſunday, becauſe this being one of the ſtated times for baptiſm in the antient church, thoſe who were baptized put on white garments, as types of that ſpiritual purity they received in baptiſm. As the deſcent of the Holy Ghoſt upon the apoſtles happened upon the day which the Jews called pentecoſt, this feſtival retained the name of pentecoſt among the chriſtians.

WHOODINGS, or HOODINGS, a ſea-term, uſed for planks joined and faſtened along the ſhip's ſides into the ſtem.

WHORE, a woman who proſtitutes herſelf for hire. See the articles CONCUBINE, COURTESAN, and HARLOT.

WHORLBAT, or HURLBAT, a kind of gauntlet, or leathern ſtrap, loaden with plummets; uſed by the antient Romans in their ſolemn games and exerciſes, and by them called cæſtus. See CÆSTUS.

WHUR, in falconry, denotes the fluttering of patridges or pheaſants, as they riſe.

WIBURG, the capital of the territory of the ſame name in Jutland: eaſt long. 9° 16′, north lat. 56° 20′.

WIBURG, a city and port-town of ruſſian Finland, ſituated on the gulph of Finland: eaſt long. 29°, north lat. 61°.

WIC, a place on the ſea ſhore, or on the bank of a river: though it properly ſignifies a town, village, or dwelling place; and ſometimes a machine.

WICCOMB CHIPPING, a borough town of Bucks, twelve miles ſouth of Ailesbury. It ſends two members to parliament.

WICK DE DUERSTEDE, a town of the United Netherlands, in the province of Utrecht, fifteen miles ſouth-eaſt of the city of Utrecht.

WICKER, a twig of the oſier ſhrub, ſingle or wrought.

WICKET, a ſmall door in the gate of a fortified place, &c. or a hole in a door, through which to view what paſſes without.

WICKLIFFISTS, or WICKLIFFITES, a religious ſect which ſprung up in England in the reign of Edward III. and took its name from John Wickliff, doctor and profeſſor of divinity in the univerſity of Oxford, who maintained that the ſubſtance of the ſacramental bread and wine remained unaltered after conſecration; and oppoſed the doctrine of purgatory, indulgences, auricular confeſſion, the invocation of ſaints, and the worſhip of images. He maintained, that the children of the religious may be ſaved without being baptized; that prieſts may adminiſter confirmation; that there ought to be only two orders in the church, that of prieſts, and that of deacons. He made an engliſh verſion of the Bible, and compoſed two volumes, called Aletheia, that is Truth, from which John Huſſe learned moſt of his doctrines. In ſhort, to this reformer we owe the firſt hint of the reformation, which was effected about two hundred years after.

WICKLOW, a county of Ireland, in the province of Leinſter, bounded by the county of Dublin, on the north; by the Iriſh channel, on the eaſt; by Wexford, on the ſouth; and by Kildare and Katerlagh, on the weſt.

WICKWARE, a market-town of Gloceſterſhire, ſituated twenty miles ſouth of Gloceſter.

WIDGEON, in ornithology, the anas with a brown head, white front, and a tail black underneath. See ANAS.

WIDOW, a woman who has loſt her huſband.

In London, a freeman's widow may exerciſe her huſband's trade, as long as ſhe continues ſuch.

Marriage with a widow, in the eye of the canon law, is a kind of bigamy.

WIDOW *of the king*, was ſhe who after her huſband's death, being the king's tenant in capite, could not marry again without the king's conſent.

WIFE, a married woman, or one joined with, and under the protection of, an huſband. See HUSBAND.

A wife, in our engliſh law, is termed feme covert; and in the judgment of the law is reputed to have no will, as being ſuppoſed intirely under, and ſubject to, that of her huſband. See COVERTURE and BARON and FEME.

The wife can make no contract without the huſband's conſent; and if any goods or chattels be given her, they all immediately become her huſband's: even neceſſary apparel is not her's in property. All her perſonal chattels, which ſhe held at her marriage, are ſo much her huſband's, that after his death they ſhall not return to her, but go to the executor or adminiſtrator of her huſband, except only her paraphernalia. See the article PARAPHERNALIA.

The wife partakes of the honour and condition of her huſband; but none of her dignities come by marriage to her huſband; and as the law ſuppoſes the huſband to have the full power over his wife, he is obliged to anſwer for all her faults and treſpaſſes. If a wife bring forth a child begot by a former huſband, or any other, before marriage, but born after marriage with another man; this latter muſt own the child; and that child ſhall be his heir at law: and if a wife bring forth a child during her huſband's abſence, though it be of many years; yet if he lived all the time within the iſland, he muſt father the child, and the child, if firſt born, ſhall inherit. If the wife has a jointure, and during her marriage is made pregnant by her huſband, which muſt appear by the child's being born alive, the huſband ſhall have all his wife's lands for life; but if the wife have no jointure ſettled before marriage, ſhe may, after her huſband's death, challenge the third part of his yearly rents of land, during her life.

WIGGAN, a borough town of Lancaſhire, twenty-nine miles ſouth of Lancaſter.

It ſends two members to parliament.

Iſle

Iſle of WIGHT, part of the county of Southampton, and ſeparated from it by a narrow channel, is about twenty miles long, and twelve broad. The chief town is Newport.

WIGTOWN, a borough and port-town of Scotland, in the ſhire of Galloway, ſituated on a bay of the Iriſh channel, ninety miles ſouth-weſt of Edinburgh.

WIHITSCH, a frontier town of Boſnia, in european Turky: eaſt long. 16° 40′, north lat. 45° 30′.

WILDERNESS, in gardening, a kind of grove of large trees, in a ſpacious garden, in which the walks are commonly made either to interſect each other in angles, or have the appearance of meanders and labyrinths. See the articles GROVE and LABYRINTH.

Wilderneſſes, ſays Mr. Miller, ſhould always be proportioned to the extent of the gardens in which they are made; for it is very ridiculous to ſee a large wilderneſs planted with tall trees in a ſmall ſpot of ground; and, on the other hand, nothing can be more abſurd, than to ſee little paltry ſquares, or quarters of wilderneſs work, in a magnificent large garden. As to the ſituation of wilderneſſes, they ſhould never be placed too near the habitation, nor ſo as to obſtruct any diſtant proſpect of the country; there being nothing ſo agreeable as an unconfined proſpect; but where, from the ſituation of the place, the ſight is confined within the limits of the garden, nothing can ſo agreeably terminate the proſpect, as a beautiful ſcene of the various kinds of trees judiciouſly planted; and if it is ſo contrived, that the termination is planted circularly, with the concave towards the ſight, it will have a much better effect, than if it end in ſtrait lines or angles. The plants ſhould always be adapted to the ſize of the plantation; for it is very abſurd for tall trees to be planted in the ſmall ſquares of a little garden; and in large deſigns ſmall ſhrubs will have a mean appearance. It ſhould alſo be obſerved, never to plant ever-greens amongſt deciduous trees; but always to place the ever-greens in a wilderneſs in a ſeparate part by themſelves, and that chiefly in ſight.

As to the walks, thoſe that have the appearance of meanders, where the eye cannot diſcover more than twenty or thirty yards in length, are generally preferable to all others, and theſe ſhould now and then lead into an open circular piece of graſs; in the center of which may be placed either an obeliſk, ſtatue, or fountain; and, if in the middle of the wilderneſs there be contrived a large opening, in the center of which may be erected a dome or banquetting-houſe, ſurrounded with a green plot of graſs, it will be a conſiderable addition to the beauty of the whole. From the ſides of the walks and openings, the trees ſhould riſe gradually one above another to the middle of the quarters, where ſhould always be planted the largeſt growing trees, ſo that the heads of all the trees may appear to view, while their ſtems will be hid from the ſight. Thus in thoſe parts which are planted with deciduous trees, roſes, honey-ſuckles, ſpiræa frutex, and other kinds of low-flowering ſhrubs, may be planted next the walks and openings; and at their feet, near the ſides of the walks, may be planted primroſes, violets, daffodils, *&c.* not in a ſtrait line, but ſo as to appear accidental, as in a natural wood. Behind the firſt row of ſhrubs ſhould be planted ſyringas, althæa frutex, mezereons, and other flowering ſhrubs of a middle growth; and theſe may be backed with many other ſorts of trees, riſing gradually to the middle of the quarters.

The part planted with ever-greens, may be diſpoſed in the following manner, *viz.* in the firſt line next the great walks, may be placed the laurus-tinus, boxes, ſpurge-laurel, juniper, ſavin, and other dwarf ever greens. Behind theſe may be placed laurels, hollies, arbutuſes, and other ever-greens of a larger growth. Next to theſe may be planted alaternuſes, phyllireas, yews, cypreſſes, virginian cedars, and other trees of the ſame growth; behind theſe may be planted Norway and ſilver firs, the true pine, and other ſorts of the fir growth; and in the middle ſhould be planted Scotch pines, pinaſter, and other of the larger growing ever-greens, which will afford a moſt delightful proſpect, if the different ſhades of the greens are curiouſly intermixed.

But beſide the grand walks and openings (which ſhould always be laid with turf, and kept well mowed) there ſhould be ſome ſmaller ſerpentine-walks through the middle of the quarters, where perſons may retire for privacy; and by the ſides of theſe private walks may alſo be ſcattered ſome wood flowers and plants, which if artfully planted, will have a very good effect.

In

In the general deſign for theſe wilderneſſes, there ſhould not be a ſtudied and ſtiff correſpondency between the ſeveral parts; for the greater diverſity there is in the diſtribution of theſe, the more pleaſure they will afford.

WILKOMERS, a city of Poland, in the dutchy of Lithuania: eaſt long. 25°, north lat. 55° 30′.

WILL, or *laſt* WILL, in law, ſignifies the declaration of a man's mind and intent relating to the diſpoſition of his lands, goods, or other eſtate, or of what he would have done after his death.

In the common law, there is a diſtinction made between a will and a teſtament; as that is called a will, where lands or tenements are given; and when the diſpoſition concerns goods and chattles alone, it is termed a teſtament. See the article TESTAMENT.

A will, though it has no force till after the teſtator's deceaſe, does then, without any other grant, or livery, *&c.* give and transfer eſtates, and alter the property either of lands or goods, as effectually as any deed or conveyance executed in a perſon's life-time, and thereby diſcents may be prevented, eſtates in fee, tail, for life, or for years, be made, and he that takes lands by deviſe is in the nature of a purchaſer. Formerly a perſon could not give away by will thoſe lands that he had by diſcent, though he might ſuch as he enjoyed by way of purchaſe; but by 34 and 35 of Hen. VIII. c. 5. all perſons that have a ſole eſtate in fee-ſimple of any lands, tenements, *&c.* may deviſe the ſame by will at their pleaſure, to whom they think fit; and this extends to perſons ſeiſed in coparcenary, or as tenants in common; but lands intailed are not deviſable, only thoſe held in fee, and goods and chattels: but wills made by infants or feme coverts, ideots, and perſons not of ſound memory, are deemed not good in law. The 29 Car. II. c. 23. has enacted, that all wills and deviſes of lands, *&c.* ſhall be in writing, ſigned by the deviſor, or ſome other by his expreſs directions, in the preſence of at leaſt three credible witneſſes; and no will made in writing ſhall be revoked, but by another will, or cancelling the ſame by the teſtator himſelf, or by his direction.

In the making of a will there are theſe ſeveral rules to be obſerved, *viz.* 1. That it be done while the teſtator is of ſound mind and memory. 2. That there be two parts thereof, the one to remain in the hands of the party that made it; and the other in the cuſtody of ſome friend, in order to render it leſs liable to be ſuppreſſed after the teſtator's death. 3. That the whole be written in one hand writing, and, if poſſible, in one ſheet of paper or parchment. 4. In caſe there be more ſheets than one, that the teſtator ſign and ſeal every ſheet, before the witneſſes preſent at the execution. For the manner of proving a will, ſee the article PROBATE.

WILL *with a wiſp*, or *Jack with a lanthorn*, a meteor known among the people under theſe names, but more uſually among authors under that of ignis fatuus. See the article METEOR.

This meteor is chiefly ſeen in ſummer-nights, frequenting meadows, marſhes, and other moiſt places. It ſeems to ariſe from a viſcuous exhalation, which being kindled in the air, reflects a ſort of thin flame in the dark, without any ſenſible heat. See HEAT and PHOSPHORUS.

It is often found flying along rivers, hedges, *&c.* by reaſon it there meets with a ſtream of air to direct it. The ignis fatuus, ſays Sir Iſaac Newton, is a vapour ſhining without heat; and there is the ſame difference between this vapour and flame, as between rotten wood ſhining without heat and burning coals of fire. See LIGHT, *&c.*

WILLIAMSBURG, capital of the colony of Virginia, ſituated in James-county, between James-river and York-river: weſt long. 76° 30′, north lat. 37° 20′.

WILLIAM's FORT, a fort belonging to the engliſh Eaſt-India company, ſituated on the weſtern branch of the river Ganges, in the province of Bengal: eaſt long. 87°, north lat. 22° 45′.

WILLIAMSTAT, a port-town of Holland, ſituated on the ſea called Hollands-Deep, fourteen miles ſouth of Rotterdam.

WILLOW, *ſalix*, in botany. See the article SALIX.

WILNA, a city of Poland, capital of the great dutchy of Lithuania, ſituated on a river of the ſame name: eaſt long. 25° 15′, north lat. 55°.

WILTON, a borough-town of Wiltſhire, ſituated on the river Willey, ſix miles northweſt of Saliſbury.

It ſends two members to parliament.

WILTSHIRE, a county of England, bounded by Glocesterſhire and Oxfordſhire, on the north; by Berkſhire and Hamp-

Hampſhire, on the eaſt; by Dorſetſhire, on the ſouth; and by Somerſetſhire, on the weſt.

WIMPFEN, a town of Germany, in the palatinate of the Rhine, ſituated on the river Neckar, twenty miles eaſt of Heidelburg.

WIMPLE, a muffler or plaited linnen-cloth, which nuns wear to cover their neck and breaſts. The word is ſometimes uſed for a ſtreamer or flag. See FLAG.

WIN, in the beginning or end of the names of places, ſignifies that ſome great battle was fought, or a victory gained there.

WINCHELSEA, a borough and port-town of Suſſex, ſituated on a bay of the Engliſh channel, thirty miles eaſt of Lewis.

It ſends two members to parliament.

WINCHESTER, the capital city of Hampſhire, ſituated on the river Itching, ſixty-five miles ſouth-weſt of London.

WIND, *ventus*, in phyſiology, a ſtream of air, flowing out of one place, or region, into another, See AIR.

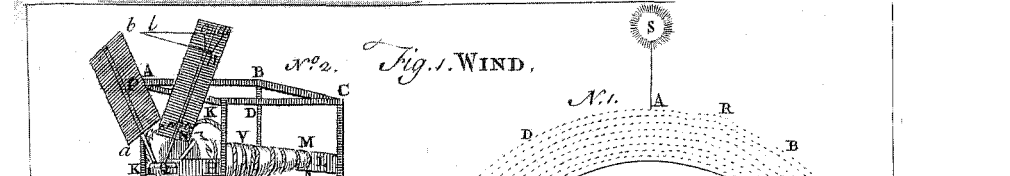
As the air is a fluid, its natural ſtate is that of reſt, which it endeavours always to keep or retrieve by an univerſal equilibrium of all its parts. When, therefore, this natural equilibrium of the atmoſphere happens by any means to be deſtroyed in any part, there neceſſarily follows a motion of all the circumjacent air towards that part, to reſtore it; and this motion of the air is what we call wind. See ATMOSPHERE.

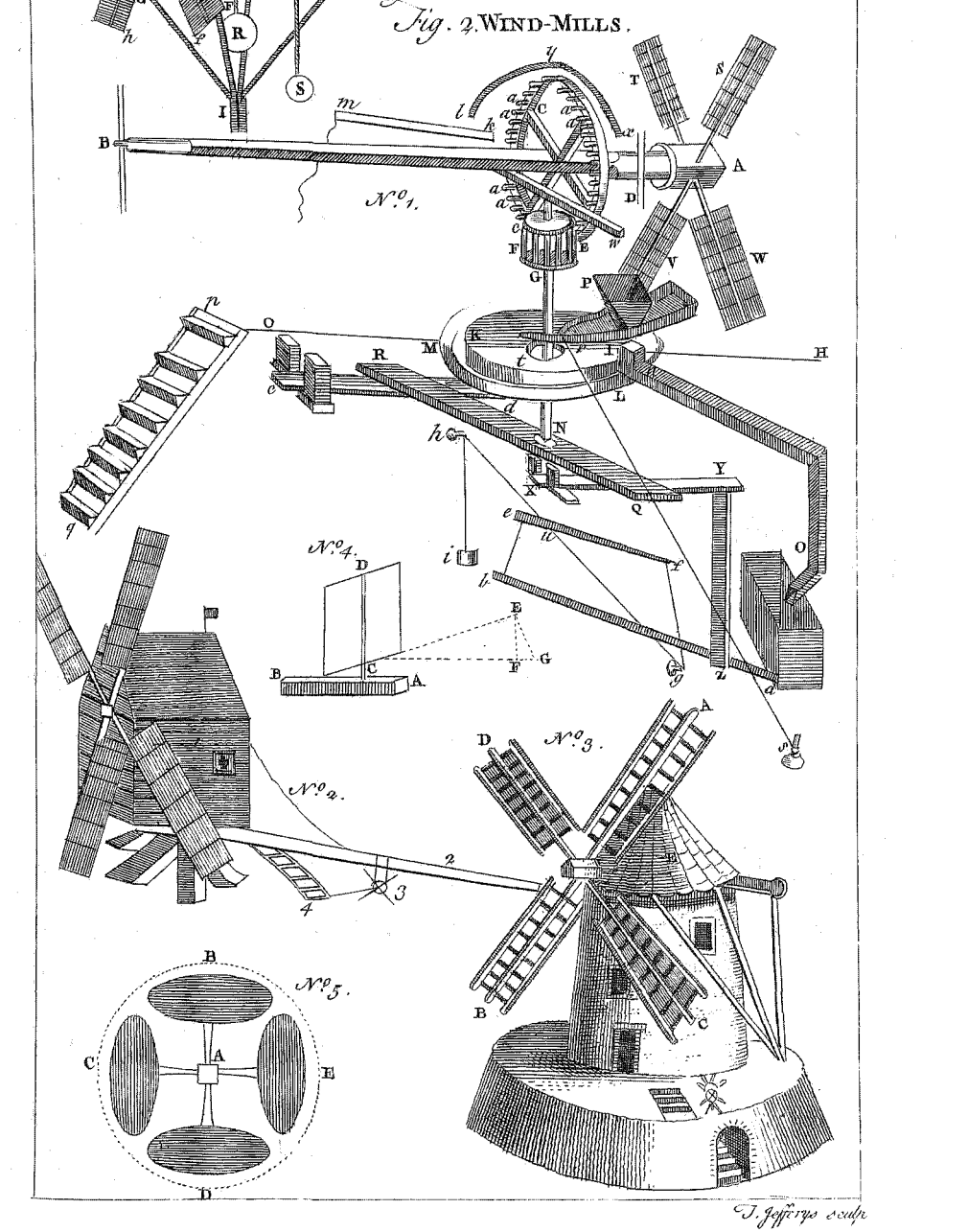
Hence, with reſpect to that place where the equilibrium of the air is diſturbed, we ſee the wind may blow from every point of the compaſs at the ſame time; and thoſe who live northwards of that point, have a north wind; thoſe who live ſouthwards, a ſouth wind; and ſo of the reſt: but thoſe who live on the ſpot, where all theſe winds meet and interfere, are oppreſſed with turbulent and boiſterous weather, whirl-winds, and hurricanes; with rain, tempeſt, lightning, thunder, *&c.* For ſulphureous exhalations from the ſouth, torrents of nitre from the north, and aqueous vapours from every part, are there confuſedly huddled, and violently blended together, and rarely fail to produce the phænomena above-mentioned. See RAIN, LIGHTNING, *&c.*

Many are the particular cauſes which produce wind by interrupting the equipoiſe of the atmoſphere; but the moſt general cauſes are two, *viz.* heat, which, by rarifying the air, makes it lighter in ſome places than it is in others; and cold, which, by condenſing it, makes it heavier. Hence it is, that in all parts over the torrid zone, the air being more rarified by a greater quantity of the ſolar rays, is much lighter than in the other parts of the atmoſphere, and moſt of all over the equatorial parts of the earth. And ſince the parts at the equator are moſt rarified, which are near the ſun; and thoſe parts are, by the earth's diurnal rotation eaſtward, continually ſhifting to the weſt; it follows, that the parts of the air which lie on the weſt ſide of the point of the greateſt rarefaction, and, by flowing towards it, meet it, have leſs motion than thoſe parts on the eaſt ſide of the ſaid point, which follow it; and therefore the motion of the eaſtern air would prevail againſt that of the weſtern air, and ſo generate a continual eaſt-wind, if this were all the effect of that rarefaction. But we are to conſider, that as all the parts of the atmoſphere are ſo greatly rarified over the equator, and all about the poles greatly condenſed by extreme cold, this heavier air from either poles is conſtantly flowing towards the equator, to reſtore the ballance deſtroyed by the rarefaction and levity of the air over thoſe regions: hence, in this reſpect alone, a conſtant north and ſouth wind would be generated.

We find by experience, that people in general have but an obſcure idea or confuſed notion of the cauſe of this perpetual current of air from eaſt to weſt, or of a conſtant eaſt wind under the equator. Therefore, in order to elucidate this matter, we ſhall explain it by a figure. Let CBADE (plate CCCI. fig. 1. n° 1.) be part of a ſection of the atmoſphere over the equator, C the eaſt, E the weſt, A the point to which the ſun S is vertical, and R the point of greateſt rarefaction, or that where the air is moſt of all heated, and, conſequently, lighteſt. That this point R is on the eaſtern ſide of the point A, is not difficult to be conceived, when what is ſaid under the article TIDE, is well conſidered. And, becauſe the air at R is by ſuppoſition lighter than where it is colder at C and D, it is plain that in order to obtain an equilibrium (which is neceſſary in a fluid body) the air by its greater weight will have a tendency from C and D towards R, and riſe to a height there greater than at C or D, in proportion as its denſity is leſs.

Now





J. Jeffreys sculp.

Now this being the caſe, it is evident, the ſun, being always between the points R and D, will be heating the air on that part; and thoſe regions between R and C, having been deſerted by the ſun, will grow cold: conſequently, the air between C and R, as it is colder, will likewiſe be heavier than that between R and D which is hotter, and ſo will have a greater momentum, or quantity of motion, towards the point R; and ſince this point R is conſtantly moving after the point A weſtward, the motion of the weſtern air towards it, will be in part diminiſhed by that means; and being alſo inferior in quantity to the motion of the eaſtern air, the latter will prevail over it, and be conſtantly following the ſaid point R from eaſt to weſt, and thus produce a continual eaſt wind.

It may, perhaps, be here ſaid, that tho' the motion of the air be leſs from D to R, yet it is ſomething, and ſo there ought to be a weſtern wind, at leaſt in ſome degree, and to ſome diſtance weſtward of the point R. To which we anſwer, that the nature of a fluid will not permit two contrary motions to reſtore or ſuſtain an equilibrium (we mean in regard of the whole body of it) for wherever one part of the fluid is determined to move, all the reſt muſt neceſſarily follow it; otherwiſe the equilibrium of the air would be deſtroyed in one part to make it good in another, a defect which nature cannot be guilty of. Thus, we ſee the tides of the ocean always follow the courſe of the moon from eaſt to weſt, without any motion of the waters from the weſt towards the moon, in the open oceans; and the point R can only be conſidered as the aerial tide, or flood of high air; and has nearly the ſame phænomena with aqueous tides. See the article TIDES.

This being clearly underſtood, all the reſt is eaſy; for no one can find it difficult to conceive how the cold air from each pole muſt neceſſarily ſet in towards the equator directly, where meeting and interfering with the eaſtern current, it does with that compound a new direction for the moving air which lies between both the former, *viz.* a north eaſt current on the north ſide, and a ſouth-eaſt on the ſouth ſide: all which naturally reſults from the doctrine of the compoſition of oblique forces. See FORCE.

And this we find to be verified in the general trade-winds, which conſtantly blow from the north-eaſt and ſouth-eaſt, to about thirty degrees on each ſide the equator, where thoſe parts are over the open ocean, and not affected with the reflection of the ſun beams from the heated ſurface of the land; for in this caſe the wind will always ſet in upon the land, as on the coaſt of Guinea, and other parts of the torrid zone, we know it does.

Velocity and force of the WIND. As the motion of the air has a greater or leſſer velocity, the wind is ſtronger or weaker; and it is found from obſervation, that the velocity of the wind is various, from the rate of 1 to 50 or 60 miles per hour. The beſt way to prove this, is to chuſe a free open place, where the wind or current of air is not at all interrupted, but flows uniformly, or as much ſo as the undulatory ſtate of the atmoſphere will admit: in ſuch a place, a feather, or other very light body, is to be let go in the wind; and then, by a half ſecond watch, or pendulum, you muſt obſerve nicely to what diſtance it is carried in any number of half ſeconds, or in how many half ſeconds it has paſſed over a given or meaſured ſpace. This will give the rate of velocity in the wind per ſecond, and of courſe per hour; which has been found, at a medium, to be 12 or 15 miles per hour: even the moſt vehement wind does not fly above 50 or 60 miles per hour; and ſometimes the wind is ſo ſlow as not to exceed the velocity of a perſon riding or walking in it; and in that caſe, if the perſon goes with the wind, he finds no wind at all, becauſe there is no difference of velocity, or no relative wind, which is that only which we are ſenſible of, whilſt in motion.

The beſt method to eſtimate the force of the wind, is by means of the following anemometer. ABCDEFGHI (*ibid.* n° 2.) is an open frame of wood, firmly ſupported by the ſhaft or poſtern I. In the croſs-pieces HK, LM, is moved an horizontal axis QM, by means of the four ſails *ab*, *cd*, *ef*, *gh*, in a proper manner expoſed to the wind. Upon this axis is fixed a cone of wood MNO, upon which, as the ſails move round, a weight S, is raiſed, by a ſtring on its ſuperficies, proceeding from the ſmall to the largeſt end NO. Upon the great end or baſe of the cone is fixed a ratchet-wheel *ik*, in whoſe teeth falls the click X, to prevent any retrograde motion from the depending weight.

From the ſtructure of this machine, it is eaſy to underſtand, that it may be accommodated to eſtimate the variable force of the wind, becauſe the force of the weight will continually increaſe, as the ſtring advances on the conical ſurface, by acting at a greater diſtance from the axis. And therefore, if ſuch a weight be put on, on the ſmalleſt part at M, as will juſt keep the machine in equilibrio with the weakeſt wind; then, as the wind becomes ſtronger, the weight will be raiſed in proportion, and the diameter of the baſe of the cone NO, may be ſo large in compariſon of that of the ſmaller end or axis at M, that the ſtrongeſt wind ſhall but juſt raiſe the weight to the great end.

Thus, for example, let the diameter of the axis be to that of the baſe of the cone NO, as 1 to 28, then if S be a weight of 1 pound at M, on the axis, it will be equivalent to 28 pounds, or $\frac{1}{4}$ of an hundred, when raiſed to the greateſt end. If, therefore, when the wind is weakeſt, it ſupports 1 pound on the axis, it muſt be 28 times as ſtrong to raiſe the weight to the baſe of the cone. Thus may a line of 28 equal parts be drawn on the ſide of the cone, and the ſtrength of the wind will be indicated by that number on which the ſtring ſhall at any time hang.

The ſtring may alſo be of ſuch a ſize, and the cone of ſuch a length, that there may be ſixteen revolutions of the ſtring betwixt each diviſion of the ſcale on the cone, whence the ſtrength of the wind will be expreſſed in pounds and ounces. And if greater exactneſs be required, let the periphery of the cone's baſe be divided into 16 equal parts; then, whenever the equilibrium happens, the ſtring will leave the conic ſurface againſt one of thoſe diviſions, and thus ſhew the force of the wind to a dram avoirdupoiſe weight.

Cardinal WINDS, are theſe which blow from the eaſt, weſt, north, and ſouth, which are called cardinal points.

Collateral WINDS, are thoſe which blow between the cardinal points. The number of theſe is infinite, as the number of points they blow from are; a few of them only are conſidered in practice, and theſe have names compounded of the cardinal points between which they blow. See the article COMPASS.

WIND-GUN, or AIR-GUN. See AIR-GUN.

WIND-MILL, a kind of mill, the internal parts of which are much the ſame with thoſe of a water mill; from which however it differs, in being moved by the impulſe of the wind upon its vanes, or ſails, which are to be conſidered as a wheel on the axle. See the articles MILL, and AXIS.

A deſcription of the mechaniſm of this uſeful engine, will, no doubt, be acceptable to our readers. AHO (pl. CCCI. fig. 2. n° 1.) is the upper room; HOZ, the under one; AB, the axle-tree, going quite through the mill; STVW, the ſails, covered with canvas, ſet obliquely to the wind, and going about in the order STVW; CD, the cog-wheel, of about 48 cogs, *a*, *a*, *a*, *&c.* which carry round the lantern EF, of 8 or 9 roundles *c*, *c*, *c*, *&c.* together with its axis GN. IK is the upper mill-ſtone; and LM, the lower one. QR is the bridge, ſupporting the axis or ſpindle GN: this bridge is ſupported by the beams *cd*, XY, wedged up at *c*, *d*, and X. ZY is the lifting-tree, which ſtands upright; *ab*, *ef*, are levers, whoſe centers of motion are Z and *e*; *fghi* is a cord, with a ſtone *i*, going about the pins *g* and *h*, and ſerving as a ballance or counterpoiſe. The ſpindle *t*N is fixed to the upper mill-ſtone IK, by a piece of iron called the rind, and fixed in the under ſide of the ſtone; which is the only one that turns about, and its whole weight reſts upon a hard ſtone, fixed in the bridge QR, at N. The trundle EF, and axis G*t*, may be taken away; for it fixes on the lower part at *t*, by a ſquare ſocket, and the top runs in the edge of the beam *w*. Putting down the end *f*, of the lever *fe*, raiſes *b*, which raiſes ZY, which raiſes YX, and this raiſes the bridge QR, with the axis NG, and the upper ſtone IK; and thus the ſtones are ſet at any diſtance. The lower immoveable ſtone is fixed upon ſtrong beams, and is broader than the upper one. The flour is conveyed through the tunnel *no*, down into a cheſt. P is the hopper, into which is put the corn, which runs along the ſpout *r*, into the hole *t*, and ſo falls between the ſtones, where it is ground. The axis G*t* is ſquare, which ſhaking the ſpout *r*, as it goes round, makes the corn run out: *rs* is a ſtring going about the pin *s*, and ſerving to move the ſpout nearer or farther from the axis, ſo as to make the corn run faſter or ſlower, according to the velocity and force of the wind. And when the wind is great, the ſails S, T, V, W, are only part, or one ſide of them, covered; or perhaps

haps only a half of two oppoſite ſails. Towards the end B, of the axle-tree is placed another cog-wheel, trundle, and mill-ſtones, with exactly the ſame apparatus; ſo that the ſame axle tree carries two ſtones at once: and when only one pair is to grind, the trundle EF, and axis G*t* is taken out from the other. *xyl* is a girt of pliable wood, fixed at the end *x*; and the other end *l*, tied to the lever *km*, moveable about *k*. And the end *m* being put down, draws the girt *xyl* cloſe to the cog-wheel; whereby the motion of the mill is ſtopped at pleaſure: *pq* is a ladder going into the higher part of the mill; and the corn is drawn up by means of a rope, rolled about the axis AB, when the mill is going.

In mills built of wood, the whole body of the mill turns round to the wind, on a tampin, or perpendicular poſt; but in thoſe of ſtone, only the upper part turns in this manner. See the mill-houſe repreſented *ibid.* n° 2. where 1 is the houſe itſelf, which is turned about to the wind by a man, with the help of the lever or beam 2: 3, is a roller to hoiſt up the ſteps 4.

In thoſe built of ſtone, only the roof E (*ibid.* n° 3.) together with axis and ſails AB, CD, turn round; in order to which, the roof is built turret-wiſe, the turret being encompaſſed with a wooden ring, in which is a groove, at the bottom of which a number of braſs-truckles are placed at certain diſtances; and within this groove is another ring, upon which the whole turret ſtands. To the upper or moveable ring are connected beams with a rope, by means of which, and a windlaſs below, the top of the machine, together with the ſails, may be turned round, and put in the direction required.

Poſition of, and force of the WIND, *upon the ſails.* As to the poſition of the ſails, we muſt conſider, that if they are placed direct to the wind, or at right angles to the axis of the mill, they will receive the whole force of the wind, which in this caſe will tend to blow them forward, and conſequently to blow down the mill; which poſition of courſe cannot be admitted.

If the ſails are ſet right to the wind, or parallel with the axis of the mill, it is plain that in that poſition the wind cannot act upon them at all, and therefore they cannot be turned round, nor the mill put in motion; which poſition of the ſails muſt likewiſe be rejected.

Since neither the direct nor right poſition of the ſails will do, an oblique poſition muſt, as there can be no other. Now to ſhew that an oblique poſition of the ſails will turn the mill, let AB (*ibid.* n° 4.) be the axis, CD a ſail, and its angle of obliquity (*viz.* that which it makes with the axis) be ECG; then if GC be the force of the wind in the direct poſition of the ſail, GE will be the force of the wind in its oblique poſition (as being the ſine of the angle of incidence GCE.) But the force GE is reſolvable into two others, EF and GF; of which the latter, being parallel to the axis, avails nothing in turning the ſail about it; but the other, EF, being perpendicular thereto, is wholly ſpent in compelling the ſail to turn round: which was the thing to be ſhewn.

The force of the wind on the ſail will be as the ſquare of the ſine of incidence, or as $\overline{GE}^2$; for the force of each ſingle particle of air will be as the ſine GE; and it will be alſo as the number of particles which ſtrike at the ſame time, which number of particles is alſo as the ſine of incidence GE. For let CD repreſent the ſection of the ſail in a direct poſition, and CG the ſame in an oblique poſition, it is plain the number of particles ſtriking it in the former caſe, will be to the number ſtriking it in the latter, as CD to CF, which is equal to GE, the ſine of incidence; for all the particles between AD and BF, will not come upon the ſail in the oblique poſition CG. Since then the force of the wind on the ſail is on two accounts as GE, it will be as the ſquare of the ſaid line GE.

If we ſuppoſe the velocity of the wind to vary, the force thereof will be as the ſquare of the velocity; for the greater the velocity, the greater will be the ſtroke of each ſingle particle, and alſo the greater will be the number of particles coming upon the ſail in the ſame time; the force will be therefore as the ſquares of the velocity.

Again, if the area of the ſail be variable, the force of the wind will be directly as the area or ſuperficies of the ſail; becauſe the number of particles of the air coming upon it, will always be proportional thereto, and conſequently the force with which they ſtrike it. Hence, if A, S, and V repreſent the area, ſine of incidence, and velocity of the wind on one ſail; and *a*, *s*, and *v*, thoſe on another: the force compelling the former to turn round, will be to that compelling

the latter, as $A \times S^2 \times V^2$ to $a \times s^2 \times v^2$.

When the area of the ſail and its poſition in reſpect of the wind, continue the ſame, the force which turns the ſail will be as the ſquares of the velocity; and ſince the wind ſcarce ever blows with one uniform velocity, but varies with almoſt every blaſt, the force upon the ſail will be much more variable and unequal; and therefore the action or working of a wind-mill cannot be ſo equal, uniform, and ſteady as that of a water-mill, whoſe power is always of the ſame tenor, while the jet of water is ſo.

If the area of the ſail and the velocity of the wind be ſuppoſed conſtant, the force of the wind in the direct poſition will be to that in the oblique one as $\overline{GC}^2$ to $\overline{GE}^2$, as we have before ſhewn; and it has been alſo ſhewn that that part of the force which turns the ſail is repreſented by EF, when GE is the whole force: but $GE : EF (:: GC : CE) :: \overline{GE}^2 : \frac{CE \times \overline{GE}^2}{GC} =$ to the force which turns the ſail, when the whole force is repreſented by $\overline{GE}^2$, as is here the proper expreſſion of it.

This expreſſion $\frac{CE \times \overline{GE}^2}{GC}$ begins from nothing, when the angle of incidence begins to be oblique, and increaſes with the obliquity of the ſaid angle to a certain number of degrees; becauſe that part of the force which is parallel to the axis becomes leſſer in proportion to that which is perpendicular to it: but after it has paſſed this limit, it again decreaſes, and becomes nothing, when the angle of incidence vaniſhes; as is eaſy to underſtand, by conſidering that the quantity of wind on the ſail does in this caſe continually decreaſe.

There is therefore one certain poſition of the ſail, in which the force of the wind is greateſt of all upon it, or a maximum; and to find it, put radius $GC = a$, $EC = x$, and we have $\overline{GE}^2 = aa - xx$, and conſequently the force $\frac{CE \times \overline{GE}^2}{GC} = \frac{aax - xxx}{a}$, which muſt be a maximum: therefore its fluxion $aa\dot{x} - 3xx\dot{x} = 0$; whence $aa = 3xx$, and ſo $x = \sqrt{\frac{aa}{3}}$ which in logarithms is $\frac{20,000000 - 0,477121}{2} = 9,761439$, which is the logarithm ſine of the angle $35^\circ 16' =$ the angle CGE; and therefore the angle ECG is equal to $54^\circ 44'$, when the force of the wind is a maximum, as required.

The angle now found, is only that which gives the wind the greateſt force to put the ſail in motion, but not the angle which gives the force of the wind a maximum upon the ſail when in motion. What this angle is, Mr. Mac Laurin has ſhewn in his book of Fluxions, to which we refer the reader.

Mr. Parent has alſo ſhewn, that an elliptic form of the ſails is better than the parallelogram, or long ſquare; and that the beſt poſition of the ſail is not that which is common, *viz.* with its longeſt ſide or diameter parallel to the axis of the ſail; but, on the contrary, it ought to be perpendicular to it; that is, they ought to be of ſuch a form, and placed in ſuch a manner, as repreſented *ibid.* n° 5. and after the four ſails B, C, D, E, are thus placed on the axis or arm A, they are then to be turned about, and fixed under the proper angle of obliquity abovementioned.

There are three things yet wanting to the perfection of a wind-mill. 1. Some contrivance in the nature of a fly, to regulate the motion of the train, under the irregular and unequal impulſe of the wind. 2. Some other contrivance to ſupply the hopper, or ſtones, with more or leſs corn, in proportion to the greater or leſs ſtrength of the wind. 3. A method of altering the angle of the ſail's obliquity, from its maximum of $54^\circ 44'$, at the beginning of the motion, to its minimum, when in motion.

WIND, in the menage. A horſe that carries in the wind, is one that toſſes his noſe as high as his ears, and does not carry handſomely. The difference between carrying in the wind, and beating upon the hand, is, that the horſe who beats upon the hand, ſhakes his head, and reſiſts the bridle; but he who carries in the wind, puts up his head without ſhaking, and only ſometimes beats upon the hand. The oppoſite to carrying in the wind, is arming and carrying low.

WIND FLOWER, *anemone*, in botany, a genus of the *polyandria-polygynia* claſs of plants, the corolla whereof conſiſts of two or three orders of petals, three in each

each order or ſeries; they are of an oval figure, and erecto-patent: there is no pericarpium; the receptacle is globoſe or oblong, and attenuated and punctated; the ſeeds are numerous, acuminated, and have the ſtyles affixed to them.

WIND-GALL, a name given by our farriers to a diſtemperature of horſes. In this caſe there are bladders full of a corrupt jelly, which, when let out, is thick, and of the colour of the yolk of an egg. They vary in ſize, but are more uſually ſmall than large. Their place is about the fetloc-joint, and they grow indifferently on all four legs, and are often ſo painful, eſpecially in the ſummer ſeaſon, when the weather is hot, and the ground dry and hard, that they make the creature frequently ſtumble, or even fall down. The general method of cure is to open the ſwelling, about the length of a bean, and to preſs out the jelly: when this is done, they apply a mixture of the oil of bays, and the white of an egg, covering it with tow. Another method is, after the jelly is all ſqueezed out, to wrap round the part a wet woolen-cloth, and then applying a taylor's hot iron, this is to be rubbed over till the moiſture is carried away; it is then to be daubed all over with pitch, maſtich, and reſin, boiled together, laying tow in plenty over all. The wind-galls that are ſituated near the ſinews, are much the moſt painful of all, and ſooneſt make the horſe lame.

The general cauſe of wind-galls is ſuppoſed to be extreme work or exerciſe in hot weather; but it is to be obſerved, that thoſe horſes which have long joints, will be wind-galled if they work never ſo little. The worſt wind-galls are thoſe of the hinder legs; all the above-mentioned methods will frequently miſs of ſucceſs in theſe, and nothing but fire will cure them.

WIND-HATCH, in mining, a term uſed to expreſs the place at which the ore is taken out of the mines.

WIND-SAILS, in a ſhip, are made of the common ſail-cloth, and are uſually between twenty-five and thirty feet long, according to the ſize of the ſhip, and are of the form of a cone ending obtuſely: when they are made uſe of, they are hoiſted by ropes to about two thirds or more of their height, with their baſis diſtended circularly by hoops, and their apex hanging downwards in the hatch-ways of the ſhip; above each of theſe, one of the common ſails is ſo diſpoſed, that the greateſt part of the air ruſhing againſt it, is directed into the wind-ſail, and conveyed, as through a funnel, into the upper parts of the body of the ſhip.

WIND-SHOCK, a name given by our farmers to a diſtemperature to which fruit-trees, and ſometimes timber-trees, are ſubject. Mortimer is of opinion that the wind-ſhock is a ſort of bruiſe and ſhiver throughout the whole ſubſtance of the tree; but that the bark being often not affected by it, it is not ſeen on the outſide, while the inſide is twiſted round, and greatly injured. It is by ſome ſuppoſed to be occaſioned by high winds; but others attribute it to lightening. Thoſe trees are moſt uſually affected by it, whoſe boughs grow more out on one ſide than on the other.

The beſt way of preventing this in valuable trees, is to take care, in the plantation, that they are ſheltered well, and to cut them frequently in a regular manner, while young. The winds not only twiſt trees in this manner, but they often throw them wholly down: in this caſe the common method is to cut up the tree for firing, or other uſes; but if it be a tree that is worth preſerving, and it be not broken, but only torn up by the roots, it may be proper to raiſe it again, by the following method. let a hole be dug deep enough to receive its roots, in the place where they before were: let the ſtraggling roots be cut off, and ſome of the branches, and part of the head of the tree; then let it be raiſed; and when the torn-up roots are replaced in the earth, in their natural ſituation, let them be well covered, and the hole filled up with rammed earth; the tree will, in this caſe, grow as well, and perhaps better, than before. If nature be left to herſelf, and the tree be not very large, the pulling off the roots will raiſe it.

WIND-TACKLE-BLOCKS, in a ſhip, are the main double blocks, which being made faſt to the end of a ſmall cable, ſerve for hoiſting of goods into the ſhip, &c. See the articles BLOCK, TACKLE, &c.

To WIND, or WEND *a ſhip*, ſignifies to bring her head about. *How winds or wends the ſhip?* is a queſtion aſked by mariners, concerning a ſhip under ſail; ſignifying as much as, upon what point of the compaſs does ſhe lie with her head?

WIND-TAUGHT, a ſea-term, ſignifying as much as ſtiff in the wind. See the article TAUGHT.

Too much rigging, high maſts, or any thing catching or holding wind aloft, is ſaid to hold a ſhip wind-taught; by which they mean, that ſhe ſtoops too much in her ſailing in a ſtiff gale of wind. Again, when a ſhip rides in a main ſtreſs of wind and weather, they ſtrike down her top-maſts, and bring her yards down, which otherwiſe would hold too much wind, or be too much diſtended, or wind-taught.

WIND-WARD, in the ſea-language, denotes any thing towards that point from whence the wind blows, in reſpect of a ſhip: thus windward-tide, is the tide which runs againſt the wind. See the articles TIDE, *&c.*

Large WIND. In the ſea-language, to ſail with a large wind, is the ſame as with a fair wind.

Side WIND, at ſea, that which blows on the ſide of the ſhip.

WINDAGE *of a gun*, the difference between the diameter of the bore, and the diameter of the ball. See the article GUN.

WINDASS, WANDASS, or WANLASS, an antient term in hunting: thus, to drive the windaſs, ſignifies the chaſing a deer to a ſtand where one is ready, with a bow or gun, to ſhoot. See the article HUNTING.

WINDER-MEB, in ornithology, the grey and white larus, with a yellow beak. See the article LARUS.

This bird is of the ſize of our widgeon, and at a diſtance appears to be all over white; the head is remarkably large, and rounded; the ears are large, as alſo are the eyes, the iris of which is of a beautiful gold yellow, and the pupil black as jet; the beak is about an inch and a quarter long, conſiderably thick, very much arched and hooked, and pointed at the extremity; the chap is entirely yellow, and has a large protuberance; the legs are very ſlender and yellow; the thighs are naked half the way up; and the feet are webbed.

WINDERS *of wool*. See the article WOOL-WINDERS.

WINDING STAIRS. See STAIRS.

WINDLASS, or WINDLACE, a machine uſed to raiſe huge weights withal, as guns, ſtones, anchors, *&c.* See MACHINE.

It is very ſimple, conſiſting only of an axis, or roller, ſupported horizontally at the two ends, by two pieces of wood and a pully: the two pieces of wood meet at top, being placed diagonally, ſo as to prop each other; the axis, or roller, goes through the two pieces, and turns in them. The pully is faſtened at top where the pieces join. Laſtly, there are two ſtaves or handſpikes go through the roller, whereby it is turned, and the rope which comes over the pully is wound off and on the ſame.

WINDLASS, in a ſhip, is an inſtrument in ſmall ſhips, placed upon the deck, juſt abaft the foremaſt. It is made of a piece of timber ſix or eight feet ſquare, in form of an axle-tree, whoſe length is placed horizontally upon two pieces of wood at the ends thereof, and upon which it is turned about by the help of handſpikes put into holes made for that purpoſe. This inſtrument ſerves for weighing anchors, or hoiſting of any weight, in or out of the ſhip, and will purchaſe much more than any capſtan, and that without any danger to thoſe that heave; for if in heaving the windlaſs about, any of the handſpikes ſhould happen to break, the windlaſs would pall of itſelf.

WINDOW, *q. d.* wind-door, an aperture or open place in the wall of a houſe, to let in the wind and light. See the article HOUSE.

We have various forms of windows, as, arched windows, circular windows, elliptical windows, ſquare and flat windows, round windows, oval windows, gothic windows, regular windows, ruſtic windows, and ſky-lights.

The chief rules in regard to windows, are, 1. That they be as few in number, and as moderate in dimenſions, as may conſiſt with other due reſpects; inaſmuch as all openings are weakenings. 2. That they be placed at a convenient diſtance from the angles, or corners of the building; becauſe that part ought not to be enfeebled, whoſe office is to ſupport and faſten all the reſt of the building. 3. That care be taken that the windows are all equal one with another, in their rank and order; ſo that thoſe on the right hand may anſwer to thoſe on the left, and thoſe above be right over thoſe below; for this ſituation of windows will not only be handſome and uniform, but alſo the void being upon the void, and the full upon the full, it will be a great ſtrengthening to the whole fabric. As to their dimenſions, care is to be taken not to give them more or leſs light than

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is needful; that is, to make them no bigger, nor leſs, than is convenient; therefore, regard is to be had to the bigneſs of the rooms which are to receive the light: it is evident, that a great room needs more light, and, conſequently, a greater window than a little room, and *è contra*. The apertures of windows, in middle-ſized houſes, may be four and a half, or five feet, between the jaumbs, and in greater buildings ſix and a half, or ſeven feet, and their height may be double their length at the leaſt. But in high rooms, or larger buildings, their height may be a third, a fourth, or half a breadth more than double their length. Theſe are the proportions of the windows for the firſt ſtory; and according to theſe muſt the upper ſtories be for breadth; but, as for height, they muſt diminiſh: the ſecond ſtory may be one-third part lower than the firſt, and the third one-fourth part lower than the ſecond. See the article BUILDING.

For architrave windows, dormer windows, tranſom windows, ſee the articles ARCHITRAVE, DORMER, *&c.*

For the ſcenography of windows, ſee the article SCENOGRAPHY.

WINDSOR, a borough-town of Berkſhire, twenty miles weſt of London, moſt remarkable for the magnificent palace or caſtle ſituated there on an eminence, which commands the adjacent country for many miles, the river Thames running at the foot of the hill. The knights of the garter are inſtalled in the royal chapel here.

It ſends two members to parliament.

WINDY TUMOURS. See TUMOUR.

WINE, *vinum*, a briſk, agreeable, ſpirituous and cordial liquor, drawn from vegetable bodies and fermented. See the articles VEGETABLE and FERMENTATION.

The character of a wine, according to Boerhaave, is, that the firſt thing it affords by diſtillation, be a thin, oily, inflammable fluid called a ſpirit. See the article SPIRIT.

This diſtinguiſhes wines from another claſs of fermented vegetable juices, *viz.* vinegar, which inſtead of ſuch ſpirit, yields, for the firſt thing, an acid uninflammable matter. See VINEGAR.

All ſorts of vegetables, fruits, ſeeds, roots, *&c.* afford wine; as grapes, currants, mulberries, elder-berries, cherries, apples, pulſe, beans, peaſe, turneps, radiſhes, and even graſs itſelf. Hence under the claſs of wines, or vinous liquors, come not only wines abſolutely ſo called, but alſo ale, cyder, *&c.* See VINOUS, MALT-LIQUOR, ALE, CYDER, *&c.*

WINE is, in a more peculiar manner, appropriated to that which is drawn from the fruit of the vine, by ſtamping its grapes in a vat, or cruſhing and expreſſing the juice out of them in a preſs, and then fermenting, *&c.* See the articles VINE, VINEYARD, GRAPE, PRESS, *&c.*

The goodneſs of wine conſiſts in its being neat, dry, fine, bright, and briſk, without any taſte of the ſoil, of a clean ſteddy colour, having a ſtrength without being heady, a body without being ſour, and keeping without growing hard or eager. The difference of flavour, taſte, colour, and body, in wines, is, perhaps, as much owing to the different manner and time of preſſing, gathering, fermenting, *&c.* the grape, as to any difference of the grape itſelf. In Hungary, whence tockay and ſome of the richeſt and higheſt flavoured wines come, they are extremely curious in theſe reſpects: for their prime and moſt delicate wines, the grape is ſuffered to continue upon the vine, till it is half dried by the heat of the ſun; and, if the ſun's heat ſhould not prove ſufficient, they are dried by the gentle heat of a furnace, and then picked one by one from the ſtalks; the juice of this grape, when preſſed out, is of a fine flavour, and ſweet as ſugar: this, after due fermentation, is kept for a year, and then racked from the lees, when it proves a generous, oily, rich wine, and is ſold at a very high rate. The Hungarians prepare a ſecond ſort of wine, by collecting together the better kind of grapes, carefully picking the fruit from the ſtalks, and then preſſing out the juice: this is extremely ſweet, and is made richer by infuſing in it, after it has fermented for ſome days, a ſufficient quantity of half dried grapes. This wine is very ſweet, oily, of a grateful taſte, and retains theſe qualities for a long time. There is a third ſort made from the pure juice of the ſame kind of grape, without any addition. This is a more briſk and lively wine, and far leſs ſweet. They likewiſe prepare a fourth ſort, from grapes of different goodneſs mixed together; this, though not ſo generous, is nevertheleſs an excellent wine. Theſe hungarian wines are remarkable for preſerving their ſweetneſs, and for the delicacy of their taſte and ſmell; they, likewiſe, do not

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grow eaſily vapid, and may be kept in perfection for many years.

Wine being a liquor moſtly of foreign produce, the divers names, forms, kinds, diſtinctions, &c. thereof, are borrowed from the countries where it is produced; the principal whereof, at this day, is France, to wines of which country, a good part of what we have to ſay of this noble liquor, will more immediately belong.

Wine in France is diſtinguiſhed from the ſeveral degrees and ſteps of its preparation, into, 1. *Mere goutte*, mother drop, which is the virgin wine, or that which runs of itſelf out at the top of the vat wherein the grapes are laid, before the vintager enters to tread or ſtamp the grapes. 2. Muſt, ſurmuſt, or ſtum, which is the wine or liquor in the vat, after the grapes have been trod or ſtamped. 3. Preſſed wine, being that ſqueezed with a preſs out of the grapes half bruiſed by the treading. The huſks left of the grapes are called rope, murk, or mark, by throwing water upon which, and preſſing them afreſh, they make a liquor for ſervants uſe, anſwerable to our cyderkin, and called *boiſſon*, which is of ſome uſe in medicine, in the cure of diſorders occaſioned by viſcid humours. 4. Sweet wine, is that which has not yet worked nor fermented. 5. Bouru, that which has been prevented working by caſting in cold water. 6. Worked wine, that which has been let work in the vat, to give it a colour. 7. Boiled wine, that which has had a boiling before it worked, and which by that means ſtill retains its native ſweetneſs. 8. Strained wine, that made by ſteeping dry grapes in water, and letting it ferment of itſelf.

Wines are alſo diſtinguiſhed with regard to their colour into white wine, red wine, claret wine, pale wine, roſe, or black wine; and with regard to their country, or the ſoil that produces them, into french wines, ſpaniſh wines, rhenish wines, hungary wines, greek wines, canary wines, &c. and more particularly into port wine, madeira wine, burgundy wine, champain wine, faſerman wine, tockay wine, ſchiras wine, &c.

Method of making, fining, &c. WINE. In the ſouthern parts of France, their way is with red wines to tread or ſqueeze the grapes between the hands, and to let the whole ſtand, juice and huſks, till the tincture be to their liking; after which they preſs it. But for white wines, they preſs the grapes immediately; when preſſed, they tun the muſt and ſtop up the veſſel, only leaving the depth of a foot or more to give room for it to work. At the end of ten days they fill this ſpace with ſome other proper wine, that will not provoke it to work again. This they repeat from time to time, new wine ſpending itſelf a little before it comes to perfection.

The uſual method of fining down wines, ſo as to render them expeditiouſly bright, clear, and fit for uſe, is this. Take an ounce of iſinglaſs, beat it into thin ſhreads with a hammer, and diſſolve it, by boiling, in a pint of water; this, when cold, becomes a ſtiff jelly. Whiſk up ſome of this jelly into a froth with a little of the wine intended to be fined, then ſtir it well among the reſt in the caſk, and bung it down tight; by this means the wine will become bright in eight or ten days. This method, however, is found to be beſt ſuited to the white wines; for the red ones, the wine-coopers commonly uſe the whites of eggs beat up to a froth, and mixed in the ſame manner with their wines.

They fine it down alſo by putting the ſhavings of green beech into the veſſel, having firſt taken off all the rind, and boiled them an hour in water to extract their rankneſs, and afterwards dried them in the ſun, or in an oven. A buſhel of theſe ſerve for a tun of wine; and being maſhed, they ſerve again and again, till almoſt quite conſumed.

For engliſh wine, the method recommended by Mortimer, is firſt to gather the grapes when very dry, to pick them from the ſtalks, then to preſs them, and let the juice ſtand twenty-four hours in a vat covered. Afterwards to draw it off from the groſs lees, and then put it up in a caſk, and to add a pint or quart of ſtrong red or white port to every gallon of juice, and let the whole work, bunging it up cloſe, and letting it ſtand till January; then bottle it in dry weather. Bradley chuſes to have the liquor, when preſſed, ſtand with the huſks, ſtalks, and all in the vat, to ferment for fifteen days. The method of converting white-wine into red, ſo much practiſed by the modern wine coopers, Dr. Shaw obſerves, is this. Put four ounces of turneſole rags into an earthen veſſel, and pour upon them a pint of boiling water; cover the veſſel cloſe, and leave it to cool; ſtrain off the liquor, which will be of a fine deep red, inclining to purple. A ſmall

portion of this colours a large quantity of wine. This tincture might be either made in brandy, or mixed with it, or elſe made into a ſyrup, with ſugar, for keeping. A common way with the wine-coopers is to infuſe the rags cold in wine for a night or more, and then wring them out with their hands; but the inconveniency of this method is, that it gives the wine a diſagreeable taſte; or what is commonly called the taſte of the rag; whence the wines, thus coloured, uſually paſs among judges for preſſed wines, which have all this taſte from the canvas rags in which the lees are preſſed. The way of extracting the tincture, as here directed, is not attended with this inconvenience; but it loads the wine with water; and if made into a ſyrup, or mixed in brandy, it would load the wine with things not wanted, ſince the colour alone is required. Hence the colouring of wines has always its inconveniencies.

In thoſe countries which do not produce the tinging grape, which affords a blood-red juice, wherewith the wines of France are often ſtained, in defect of this, the juice of elder-berries is uſed, and ſometimes logwood is uſed at Oporto.

The colour afforded by the method here propoſed, gives wine the tinge of the Bourdeaux-red, not the port; whence the foreign coopers are often diſtreſſed for want of a proper colouring for red wines in bad years. This might, perhaps, be ſupplied by an extract made by boiling ſtick-lack in water. The ſkins of tinging grapes might alſo be uſed, and the matter of the turneſole procured in a ſolid form, not imbibed in rags.

Stahl obſerves, that it is a common accident, and a diſeaſe in wines, to be kept too hot; which is not eaſy to cure when it has been of any long continuance, otherwiſe it may be cured by introducing a ſmall artificial fermentation, that new ranges the parts of the wine, or rather recovers their former texture: but the actual expoſing of wine to the fire, or the ſun, preſently diſpoſes it to turn eager; and the making it boiling hot, is one of the quickeſt ways of expediting the proceſs of making of vinegar.

On the other hand, wine kept in a cool vault, and well ſecured from the external air, will preſerve its texture entire in all the conſtituent parts, and ſufficiently ſtrong for many years, as appears not only from old wines, but other foreign fermented liquors, particularly thoſe of China, prepared from a decoction of rice, which being well cloſed down in a veſſel, and buried deep under ground, will continue, for a long ſeries of years, rich, generous, and good, as the hiſtories of that country univerſally agree in aſſuring us.

The moſt general remedy hitherto known for all the diſeaſes of wines, is a prudent uſe of tartarized ſpirit of wine, which not only enriches, but diſpoſes all ordinary wines to grow fine.

If either by fraud or accident a larger portion of water is mixed with wine than is proper for its conſiſtence, and no way neceſſary or eſſential, this ſuperfluous water does not only deprave the taſte, and ſpoil the excellence of the wine, but alſo renders it leſs durable; for humidity in general, and much more a ſuperfluous aqueous humidity, is the primary and reſtleſs inſtrument of all the changes that are brought on by fermentation. It may doubtleſs, therefore, be uſeful, and ſometimes abſolutely neceſſary, to take away this ſuperfluous water from the other part which ſtrictly and properly conſtitutes the wine. This has been agreed upon on all hands as a thing proper; but the manner of doing it has not been well agreed on; ſome have propoſed the effecting it by means of heat and evaporation, others by percolation, and others by various other methods, all found unſucceſsful when brought to the trial; but the way propoſed by Dr. Shaw from Stahl, is the moſt certain and commodious; this is done by a concentration of the wine, not by means of heat, but of cold.

If any kind of wine, but particularly ſuch as has never been adulterated, be in a ſufficient quantity, as that of a gallon or more, expoſed to a ſufficient degree of cold in froſty weather, or be put into any place where ice continues all the year, as in our ice-houſes, and there ſuffered to freeze, the ſuperfluous water that was originally contained in the wine, will be frozen into ice, and will leave the proper and truly eſſential part of the wine unfrozen, unleſs the degree of cold ſhould be very intenſe, or the wine but weak and poor. This is the principle on which Stahl founds his whole ſyſtem of condenſing wines by cold. When the froſt is moderate, the experiment has no difficulty, becauſe not above a third or a fourth part of the ſuperfluous water will be froze in a whole night; but if

the cold be very intenſe, the beſt way is, at the end of a few hours, when a tolerable quantity of ice is formed, to pour out the remaining fluid liquor, and ſet it in another veſſel to freeze again by itſelf. If the veſſel, that thus by degrees receives the ſeveral parcels of the condenſed wine, be ſuffered to ſtand in the cold freezing place where the operation is performed, the quantity lying thin in the pouring out, or otherwiſe, will be very apt to freeze anew; and if it be ſet in a warm place, ſome of this aqueous part thaws again, and ſo weakens the reſt. The condenſed wine, therefore, ſhould be emptied in ſome place of a moderate degree as to cold or heat, where neither the ice may diſſolve, nor the vinous ſubſtance mixed among it be congealed. But the beſt expedient of all is to perform the operation with a large quantity of wine, or that of ſeveral gallons, where the utmoſt exactneſs, or the danger of a trifling waſte, need not be regarded.

By this method, when properly performed, there firſt freezes about one third part of the whole liquor; and this is properly the more purely aqueous part of it, inſomuch that when all the vinous fluid is poured off, to be again expoſed to a concentration, the ice remaining behind, from this firſt freezing, being ſet to thaw in a warm place, diſſolves into a pure and taſteleſs water. The frozen part, or ice, conſiſts only of the watery part of the wine, and may be thrown away, and the liquid part retains all the ſtrength, and is to be preſerved. This will never grow ſour, muſty, or mouldy afterwards, and may at any time be reduced to wine of the common kind again, by adding to it as much water as will make it up to the quantity that it was before.

Wines in general may by this method be reduced to any degree of vinoſity or perfection.

The benefit and advantage of this method of congelation, if reduced to practice in the large way, in the wine countries, muſt be evident to every body. Concentrated wines, in this manner, might be ſent into foreign countries, inſtead of wine and water, which is what is uſually now ſent, the wines they export being loaded, and in danger of being ſpoiled by three or four times their own quantity of unneceſſary, ſuperfluous, and prejudicial water.

An eaſy method of recovering pricked wines, may be learned from the following experiment: take a bottle of red port that is pricked, add to it half an ounce of tartarized ſpirit of wine, ſhake the liquor well together, and ſet it by for a few days, and it will be found very remarkably altered for the better.

This experiment depends upon the uſeful doctrine of acids and alkalies. All perfect wines have naturally ſome acidity, and when this acidity prevails too much, the wine is ſaid to be pricked, which is truly a ſtate of the wine tending to vinegar: but the introduction of a fine alkaline ſalt, ſuch as that of tartar, imbibed by ſpirit of wine, has a direct power of taking off the acidity, and the ſpirit of wine alſo contributes to this, as a great preſervative in general of wines. If this operation be dexterouſly performed, pricked wines may be abſolutely recovered by it, and remain ſaleable for ſome time: and the ſame method may be uſed to malt liquors juſt turned ſour.

The age of wine is properly reckoned by leaves; thus they ſay wine of two, four, or ſix leaves, to ſignify wine of two, four, or ſix years old; taking each new leaf put forth by the vine, ſince the wine was made, for a year.

The net duties to be paid on importation of all wines into the port of London, and repaid on exportation, are as follows.

Wines imported by Britiſh for ſale. Rheniſh, german, or hungary wines, the ton, filled in caſks, pay, on importation, 35l. 2s. $\frac{72}{100}$d. and, on exportation, draw back 26l. 13s. $8\frac{88}{100}$d. in bottles, on importation, 35l. 15s. $3\frac{12}{100}$d. and draw back, on exportation, 27l. 5s. $4\frac{8}{100}$d. Portugal or madeira wine, the ton filled in caſks, pays, on importation, 28l. 8s. $3\frac{12}{100}$d. and, on exportation, draws back 20l. 6s. $4\frac{8}{100}$d. in bottles, on importation, 31l. 5s. $3\frac{12}{100}$d. and, on exportation, draws back 22l. 15s. $4\frac{8}{100}$d. French wine, the ton filled in caſk, on importation, pays 60l. 16s. $4\frac{8}{100}$d. and, on exportation, draws back, 26l. 2s. $11\frac{12}{100}$d. in bottles, on importation, 64l. 5s. $4\frac{8}{100}$d. and, on exportation, draws back 27l. 18s. $8\frac{72}{100}$d. Levant and all other wines, the ton filled in caſks pays, on importation, 29l. 4s. $9\frac{12}{100}$d. and, on exportation, draws back 21l. 2s. $10\frac{8}{100}$d. in bottles, on impor-

importation, pays 32l. 3s. $9\frac{12}{100}$d. and, on exportation, draws back, 23l. 13s. $10\frac{8}{100}$d. Wines imported by Britiſh for private uſe. Rheniſh, german, or hungary wine, the ton filled in caſks, pays, on importation, 36l. $3\frac{60}{100}$d. and, on exportation, draws back 27l. 5s. $10\frac{80}{100}$d. in bottles, on importation, the ton pays 36l. 13s. 6d. and, on exportation, draws back 27l. 17s. 6d. Portugal or madeira wine, the ton filled in caſks, on importation, pays 29l. 6s. 6d. and, on exportation, draws back 20l. 18s. 6d. in bottles, on importation, 32l. 3s. 6d. and, on exportation, draws back 23l. 7s. 6d. French wine, the ton filled in caſks, pays, on importation, 61l. 8s. 6d. and, on exportation, draws back 26l. 11s. $\frac{40}{100}$d. in bottles, on importation, 64l. 17s. 6d. and, on exportation, draws back 28l. 6s. 10d. Levant and all other wines, the ton filled in caſks, pays, on importation, 30l. 3s. and, on exportation, draws back 21l. 15s. in bottles, on importation, 33l. 2s. and, on exportation, draws back 24l. 6s. And beſides the afore-mentioned duties, all wines imported into the port of London, are to pay to the uſe of the orphans of the ſaid city, for every ton, 4s.

Wines imported by foreigners are to pay, beſides the aforeſaid duties, the undermentioned, which muſt be added reſpectively to the duties payable by Britiſh. Rheniſh, german or hungary wines, the ton filled in caſks, on importation, pays 4l. 8s. $2\frac{40}{100}$d. and, on exportation, draws back 4l. 3s. $2\frac{40}{100}$. in bottles, on importation, 4l. 10s. and, on exportation, draws back 4l. 5s. French wine, the ton in caſks, pays, on importation, 4l. 4s. $7\frac{20}{100}$d. and, on exportation, draws back 3l. 19s. $7\frac{20}{100}$d. in bottles, on importation, 4l. 10s. and, on exportation, draws back 4l. 5s. Levant and all other wines, filled in caſks, the ton pays, on importation, 4l. 1s. and, on exportation, draws back 3l. 16s. in bottles, on importation, 4l. 10s. and, on exportation, draws back 4l. 5s. And beſides thoſe duties, all wines of the growth of the Levant, imported into any port by foreigners, are to pay to the uſe of the town of Southampton, for every butt or pipe, 10s.

WINE is alſo a denomination applied in medicine and pharmacy to divers mixtures and compoſitions wherein the juice of the grape is a principal ingredient. See the article VINUM.

With regard to the medical uſes of wines, it is obſerved, that among the great variety of wines in common uſe among us, five are employed in the ſhops as menſtrua for medicinal ſimples; that is, the vinum album hiſpanicum, or mountain wine; the vinum album gallicum, or french white wine; the canary wine, or ſack; the rheniſh wine; and the red port. The effects of theſe liquors on the human body, are to chear the ſpirits, warm the habit, promote perſpiration, render the veſſels full and turgid, raiſe the pulſe, and quicken the circulation. The effects of the full bodied wines are much more durable than thoſe of the thinner; all ſweet wines, as canary, abound with a glutinous, nutritious ſubſtance, whilſt the others are not nutrimental, or only accidentally ſo, by ſtrengthening the organs employed in digeſtion. Sweet wines, in general, do not paſs off freely by urine; and they heat the conſtitution more than an equal quantity of any other, though containing full as much ſpirit: red port, and moſt of the red wines, have an aſtringent quality, by which they ſtrengthen the tone of the ſtomach, and thus prove ſerviceable for reſtraining immoderate ſecretions; thoſe which are of an acid nature, as rheniſh, paſs freely by the kidneys, and gently looſen the belly. It is ſuppoſed that theſe laſt exaſperate and occaſion gouty calculous diſorders, and that new wines of every kind have this effect.

WINE-SPIRIT, a term uſed by our diſtillers, and which may ſeem to mean the ſame thing with the phraſe of ſpirit of wine; but they are taken in very different ſenſes in the trade.

Spirit of wine is the name given to the common malt ſpirit, when reduced to an alcohol, or totally inflammable ſtate; but the phraſe wine-ſpirit is uſed to expreſs a very clean and fine ſpirit, of the ordinary proof ſtrength, and made in England from wines of foreign growth.

The way of producing it is by ſimple diſtillation, and it is never rectified any higher than common bubble proof. The ſeveral wines of different natures, yield very different proportions of ſpirit; but, in general, the ſtrongeſt yield one fourth, the weakeſt in ſpirits one eighth part of proof-ſpirit; that is, they contain from

a ſixteenth to an eighth part of their quantity of pure alcohol.

Wines that are a little ſour, ſerve not at all the worſe for the purpoſes of the diſtiller, they rather give a greater vinoſity to the produce. This vinoſity is a thing of great uſe in the wine-ſpirit, whoſe principal uſe is to mix with another that is tartarized, or with a malt-ſpirit, rendered alkaline by the common method of rectification. All the wine-ſpirits made in England, even thoſe from the french wines, appear very greatly different from the common french brandy; and this has given our diſtillers a notion that there is ſome ſecret art practiſed in France, for the giving the agreeable flavour to that ſpirit; but this is without foundation. See the article SPIRIT.

WINE PRESS. See the article PRESS.

Lees of WINE. See LEES.

Piece of WINE. See PIECE.

Priſage of WINE. See PRISAGE.

Racking of WINE. See RACKING.

Spirit of WINE. See SPIRIT.

Stooming of WINE. See STOOMING.

WING, *ala*, that part of a bird, inſect, *&c.* whereby it is enabled to fly. See the articles FLYING, FEATHER, *&c.*

Willughby obſerves, that all birds whatſoever have wings, or rudiments of wings, which anſwer to the fore legs in quadrupeds. Among land-fowl he obſerves, that the oſtrich, caſſowary, and dodo; and among water-fowl, the penguin, have wings altogether uſeleſs and unfit for flight. See the articles ORNITHOLOGY, OSTRICH, *&c.*

Inſects, indeed, have wings, and ſo have bats, but of a different kind from thoſe of birds; the former being membranaceous, and the latter cutaneous: birds only have wings made up of feathers.

All birds, towards the extremity of their wings, have a certain finger-like appendix, which is commonly called the ſecundary or baſtard-wing. It is made up of four or five ſmall feathers. Beſides this under the wing, or on the inſide of the wing, ſome birds, eſpecially water-fowl, have a row of feathers growing, called interior baſtard wing, which in moſt birds is of a white colour. See the articles INSECT, BAT, *&c.*

Reaumur obſerves, that wings among the fly-claſs, afford ſeveral ſubordinate diſtinctions of the genera of thoſe animals, under the antient general claſſes. Several ſpecies of flies, while they are in a ſtate of reſt, or only walking, ſhew ſeveral regularly diſtinct manners of carrying their wings. The much greater number, however, carry them in a parallel or plain poſition. Among thoſe who carry them thus, ſome have them in form of a ſort of ores, their direction being perpendicular to the length of the body, which is not at all covered by them. Others carry their wings in this manner, ſo as that they cover a part of the body, without at all covering one another. The wings of others croſs one another on the body of the creature, and the degrees in which they cover one another, give occaſion to ſeveral other ſub-diſtinctions; for ſome of them over-hang on each ſide the body of the animal, while others croſs one another, in ſuch a manner as not to cover the body of the fly entirely, but leave a rim of it viſible and uncovered on each ſide of them. Some of the flies bred of water-worms, have their wings in this manner. Others have their wings thus diſpoſed, but croſſing one another only in a part of their ſurface, and that at their extremities; ſo that though they there cover the body of the fly, they leave a portion of the anterior part of the body naked. See the article FLY.

The beautiful wings of butterflies are diſtinguiſhed from thoſe of the fly-kind, by their not being thin and tranſparent, like them, but thicker and opake. This opacity in them is only owing to the duſt which comes off them, and ſticks to the fingers in handling them; and it is alſo to this duſt that they owe all their beautiful variety of colours. The earlier naturaliſts, for this reaſon, diſtinguiſhed theſe inſects by the appellation of ſuch as had farinaceous wings.

The wings of gnats are of a very curious ſtructure, and well worthy the uſe of the microſcope, to ſee them diſtinctly. It is well known, that on touching the wings of butterflies, a coloured powder is left on the fingers, which, though to the naked eye it appears a mere ſhapeleſs duſt, yet when examined by the microſcope, it is found to be very regularly figured beautiful bodies, in form of feathers and ſcales: theſe are of various figures, and all of them very elegant. The generality of flies have nothing of this kind; but the cloſe examination of the wings of the gnat will ſhew, that they are not wholly deſtitute of them: they

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are much more ſparingly beſtowed, indeed, upon the gnat than on the butterfly; but then they are arranged with great regularity.

WINGS, in heraldry, are borne ſometimes ſingle, ſometimes in pairs; in which caſe they are called conjoined. When the points are downward, they are ſaid to be inverted; when up, elevated. See VOL.

WING, in botany, the angle formed between the ſtem and the leaves or pedicles of the leaves of a plant. See the article LEAF, *&c.*

WINGS, *alæ*, in military affairs, are the two flanks or extremes of an army, ranged in form of battle; being the right and left ſides thereof. See the articles ARMY, BATTALION, *&c.*

WINGS, in fortification, denote the longer ſides of horn-works, crown-works, tenailles, and the like out-works; including the ramparts and parapets, with which they are bounded on the right and left, from their gorge to their front.

WINGED, in botany, a term applied to ſuch ſtems of plants as are furniſhed all their length with a ſort of membraneous leaves, as the thiſtle, *&c.*

Winged leaves, are ſuch as conſiſt of divers little leaves, ranged in the ſame direction, ſo as to appear only as the ſame leaf. Such are the leaves of agrimony, acacia, aſh, *&c.* See LEAF.

Winged ſeeds, are ſuch as have down or hairs on them, which, by the help of the wind, are carried to a diſtance. See the article SEED.

WINNOW, ſignifies to fan or ſeparate corn from the chaff by the wind.

WINOXBERG, a town of the french Netherlands, in the province of Flanders, ſituated on the river Colme, five miles ſouth of Dunkirk.

WINSCHOTEN, a town of the United Provinces, in the province of Groningen, ſituated ſixteen miles ſouth eaſt of Groningen.

WINSEN, a town of Germany, in the circle of Lower Saxony, and dutchy of Lunenburg, ſituated at the confluence of the river Elbe and Ilmenau, fifteen miles north-weſt of Lunenburg.

WINSLOW, a market-town of Bucks, ſix miles north of Aileſbury.

WINSTER, a market-town of Darbyſhire, ſituated ten miles north of Darby.

WINTER, one of the four ſeaſons or quarters of the year. See SEASON, *&c.*

Winter commences on the day when the ſun's diſtance from the zenith of the place is greateſt, and ends on the day when its diſtance is at a mean between the greateſt and leaſt. See the articles SUN and EARTH.

Notwithſtanding the coldneſs of the ſeaſon, it is proved by aſtronomers, that the ſun is really nearer the earth in winter than in ſummer; the reaſon of the decay of heat, and the truth of this propoſition, ſee explained under the articles HEAT, LIGHT, EARTH, *&c.*

Under the equator, the winter as well as other ſeaſons, return twice every year; but all other places have only one winter in the year, which in the northern hemiſphere begins when the ſun is in the tropic of capricorn, and in the ſouthern hemiſphere when in the tropic of cancer; ſo that all places in the ſame hemiſphere have their winter at the ſame time. See the article TROPIC.

WINTER, among printers, that part of the printing-preſs ſerving to ſuſtain the carriage. See PRINTING-PRESS.

WINTER'S BARK, *cortex winteranus*, in botany, a name given to the bark of the white or wild cinnamon tree. See the article CINNAMON.

The winter's bark is a thick and firm bark, though we have a different thing ſometimes under its name: it comes to us rolled up in the manner of the common cinnamon, into a kind of tubes or pipes; but they are uſually thicker, and always ſhorter than the fine tubes of cinnamon. It is externally of a greyiſh colour, and of a reddiſh brown within; it is properly, indeed, a double bark, the outer and inner of the ſame tree, not the inner bark alone, ſeparated from the other, as the cinnamon and caſſia are. The outer rind is of an uneven ſurface and of a looſe texture, very brittle and eaſily powdered. The inner bark, which has the principal virtue, is hard, and of a duſky reddiſh brown. The outer one is often craked and open in ſeveral places, the inner one never in any. It is of an extremely fragrant and aromatic ſmell, and of a ſharp, pungent, and aromatic taſte, much hotter than cinnamon in the mouth, and leaving a more laſting flavour in it.

It is to be choſen in pieces not too large, with the inner or brown part ſound and firm, and of a very ſharp taſte. It is apt to be worm-eaten; but in that caſe it is wholly to be rejected, as having loſt the far greater part of its virtue.

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The cortex winteranus was wholly unknown to the antients; the diſcovery of it among us is owing to captain Winter, who, in the year 1567, going as far as the ſtreights of Magellan with Sir Francis Drake, found this bark on that coaſt, and bringing a large quantity of it with him in his return to England, it became uſed in medicine, and was ever after called by his name. It is not, however, peculiar to the place he found it in, but is frequent in many parts of America.

The virtues of this bark were diſcovered by the engliſh ſailors on board captain Winter's ſhip; they firſt uſed it by way of ſpice to their foods, and afterwards for the ſcurvy. It is alſo good in palſies and rheumatiſms; and a decoction of the leaves is good by way of fomentation, for the parts externally affected by the ſcurvy. The engliſh ſailors made it famous for its virtues againſt the poiſon of a certain fiſh, common about the Magellanic ſea, and which they called the ſea-lion. They eat the fleſh of this fiſh, and fell into many illneſſes by it, among which was one attended with a peeling off the ſkin of their whole bodies, not without exceſſive pain; this they remedied by the cortex winteranus; but by the accounts we have of the effects of eating this fiſh, as it is called, they were rather ſymptoms of an inveterate ſcurvy, and, therefore, it is no wonder this bark did them great ſervice.

WINTER-QUARTERS. See QUARTERS.

WINTER-RIG, among huſbandmen, ſignifies to fallow or till the land in winter. See the article FALLOW.

WINTER SOLSTICE. See SOLSTICE.

WINTERTONNESSE, the north cape of the county of Norfolk, four miles north of Yarmouth.

WINTSHEIM, a town of Germany, in the circle of Franconia, and marquiſate of Anſpach, ſituated fifteen miles north of Anſpach.

WIRE, WIAR, WIER, or WYRE, a piece of metal drawn through the hole of an iron into a thread of a fineneſs anſwerable to the hole it paſſed through.

Wires are frequently drawn ſo fine, as to be wrought along with other threads of ſilk, wool, flax, &c.

The metals moſt commonly drawn into wire, are gold, ſilver, copper, and iron.

Gold-wire is made of cylindrical ingots of ſilver, covered over with a ſkin of gold, and thus drawn ſucceſſively through a vaſt number of holes, each ſmaller and ſmaller; till at laſt it is brought to a fineneſs exceeding that of a hair. That admirable ductility which makes one of the diſtinguiſhing characters of gold, is no where more conſpicuous, than in this gilt wire. A cylinder of forty-eight ounces of ſilver, covered with a coat of gold, only weighing one ounce, as Dr. Halley informs us, is uſually drawn into a wire, two yards of which weigh no more than one grain; whence ninety-eight yards of the wire weigh no more than forty-nine grains, and one ſingle grain of gold covers the ninety-eight yards; ſo that the ten-thouſandth part of a grain is above one-eighth of an inch long. The ſame author, computing the thickneſs of the ſkin of gold, found it to be $\frac{1}{134500}$ part of an inch. Yet ſo perfectly does it cover the ſilver, that even a microſcope does not diſcover any appearance of the ſilver underneath. M. Rohault likewiſe obſerves, that a like cylinder of ſilver, covered with gold, two feet eight inches long, and two inches nine lines in circumference, is drawn into a wire 307200 feet long, *i. e.* into 115200 times its former length. Mr. Boyle relates, that eight grains of gold, covering a cylinder of ſilver, is commonly drawn into a wire 13000 feet long. See the articles GOLD and DUCTILITY.

Silver-wire is the ſame with gold-wire, except that the latter is gilt, or covered with gold, and the other is not.

There are alſo counterfeit gold and ſilver-wires; the firſt made of a cylinder of copper, ſilvered over, and then covered with gold; and the ſecond of a like cylinder of copper, ſilvered over, and drawn through the iron, after the ſame manner as gold and ſilver-wire.

Braſs-wire is drawn after the ſame manner as the former. Of this there are divers ſizes, ſuited to the different kinds of works. The fineſt is uſed for the ſtrings of muſical inſtruments, as ſpinets, harpſichords, manichords, &c. See the article SPINET, &c.

The pin-makers, likewiſe, uſe vaſt quantities of braſs-wire, to make their pins of.

Iron-wire is drawn of various ſizes, from half an inch to one tenth of an inch diameter.

The firſt iron that runs from the ſtone, when melting, being the ſofteſt and tougheſt, is preſerved to make wire of.

Iron-wire is made from ſmall bars of iron called eſleom-iron, which are firſt drawn

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out to a greater length, and to about the thickneſs of ones little finger, at a furnace, with a hammer gently moved by water. Theſe thinner pieces are bored round, and put into a furnace to aneal for twelve hours. A pretty ſtrong fire is uſed for this operation. After this they are laid under water for three or four months, the longer the better; then they are delivered to the workmen, called rippers, who draw them into wire thro' two or three holes. After this they aneal them again for ſix hours, and water them a ſecond time for about a week, and they are then delivered again to the rippers, who draw them into wire of the thickneſs of a large packthread. They are then aneal'd a third time, and then watered for a week longer, and delivered to the ſmall wire-drawers, called over-houſe-men.

In the mill where this work is performed, there are ſeveral barrels hooped with iron, which have two hooks on their upper ſides, on each whereof hang two links, which ſtand acroſs, and are faſtened to the two ends of the tongs, which catch hold of the wire, and draw it through the hole. The axis on which the barrel moves does not run through the center, but is placed on one ſide, which is that on which the hooks are placed; and underneath there is faſtened to the barrel a ſpoke of wood, which they call a ſwingle, which is drawn back a good way by the cogs in the axis of the wheel, and draws back the barrel, which falls to again by its own weight. The tongs hanging on the hooks of the barrel, are by the workmen faſtened to the end of the wire, and by the force of the wheel, the hooks being pulled back, draw the wire through the holes. The plate in which the holes are, is iron on the outſide, and ſteel on the inſide; and the wire is anointed with train-oil, to make it run the eaſier.

WIRE *of Lapland*. The inhabitants of Lapland have a ſort of ſhining ſlender ſubſtance in uſe among them on ſeveral occaſions, which is much of the thickneſs and appearance of our ſilver-wire, and is therefore called, by thoſe who do not examine its ſtructure or ſubſtance, lapland-wire. It is made of the ſinews of the reindeer, which being carefully ſeparated in the eating, are, by the women, after ſoaking in water, and beating, ſpun into a ſort of thread, of admirable fineneſs and ſtrength, when wrought to the ſmalleſt filaments; but when larger, is very ſtrong, and fit for the purpoſes of ſtrength and force. Their wire, as it is called, is made of the fineſt of theſe threads, covered with tin. The women do this buſineſs, and the way they take is to melt a piece of tin, and placing at the edge of it a horn with a hole through it, they draw theſe ſinewy threads, covered with the tin, through the hole, which prevents their coming out too thick covered. This drawing is performed with their teeth; and there is a ſmall piece of bone placed at the top of the hole, where the wire is made flat, ſo that we always find it rounded on all ſides but one, where it is flat.

This wire they uſe in embroidering their cloaths as we do gold and ſilver; they often ſell it to ſtrangers, under the notion of its having certain magical virtues.

WIRKSWORTH, a market-town of Darbyſhire, ſituated ſix miles north of Darby.

WISBEACH, a market-town of the iſle of Ely, in Cambridgeſhire, ſituated fifteen miles north of Ely.

WISLEY, a port-town of Sweden, ſituated on the weſt coaſt of the iſland of Gothland, one hundred and ten miles ſouth of Stockholm.

WISDOM, *ſapientia*, uſually denotes a higher and more refined notion of things immediately preſented to the mind, as it were, by intuition, without the aſſiſtance of ratiocination. See UNDERSTANDING, REASON, KNOWLEDGE, *&c.*

In this ſenſe wiſdom may be ſaid to be a faculty of the mind, or at leaſt a modification and habit thereof. See FACULTY, MODIFICATION, HABIT, *&c.*

Sometimes the word is more immediately uſed, in a moral ſenſe, for what we call prudence, or diſcretion, which conſiſts in the ſoundneſs of the judgment, and a conduct anſwerable thereto.

WISMAR, a town of Germany, in the circle of lower Saxony, and dutchy of Mecklenburg, ſituated on a bay of the Baltic-ſea, twelve miles north of Swerin.

WISSELOCK, a town of Germany, in the palatinate of the Rhine, ſituated ſeven miles ſouth of Heidelburg.

WISTON, a market-town of Pembrokeſhire, ſituated ten miles north of Pembroke.

WIT, a faculty of the mind, conſiſting, according to Mr. Locke, in the aſſembling

ling and putting together of thoſe ideas, with quickneſs and variety, in which any reſemblance or congruity can be found, in order to form pleaſant pictures and agreeable viſions to the fancy. This faculty, the ſame author obſerves, is juſt the contrary of judgment, which conſiſts in the ſeparating carefully from one another, ſuch ideas wherein can be found the leaſt difference, thereby to avoid being miſled by ſimilitude and affinity, to take one thing for another. It is the metaphor and alluſion, wherein, for the moſt part, lies the entertainment and pleaſantry of wit, which ſtrikes ſo lively on the fancy, and is therefore ſo acceptable to all people, becauſe its beauty appears at firſt ſight, and there is required no labour of thought to examine what truth or reaſon there is in it. The mind, without looking any farther, reſts ſatisfied with the agreeableneſs of the picture, and the gaiety of the imagination; and it is a kind of affront to go about to examine it by the ſevere rules of truth or reaſon. See the article IMAGINATION, *&c.*

Wit is alſo an appellation given to the perſon poſſeſſed of this faculty; and here the true wit muſt have a quick ſucceſſion of pertinent ideas, and the ability of arranging and expreſſing them in a lively and entertaining manner; he muſt at the ſame time have a great deal of energy and delicacy in his ſentiments; his imagination muſt be ſprightly and agreeable, without any thing of parade or vanity in his diſcourſe: but it is not, however, eſſential to the character of a wit, to be ever hunting after the brilliant, ſtudying ſprightly turns, and affecting to ſay nothing but what may ſtrike and ſurprize. See the article FACULTY, *&c.*

WITCHCRAFT, a kind of ſorcery, eſpecially in women, in which it is ridiculouſly ſuppoſed that an old woman, by entering into a contract with the devil, is enabled, in many inſtances, to change the courſe of nature; to raiſe winds; perform actions that require more than human ſtrength; and to afflict thoſe who offend them with the ſharpeſt pains, *&c.* In the times of ignorance and ſuperſtition, many ſevere laws were made againſt witches, by which great numbers of innocent perſons, diſtreſſed with poverty and age, were brought to a violent death; but theſe are now happily repealed.

WITENA-MOT, or WITENA-GEMOT, among our ſaxon anceſtors, was a term which literally ſignified the aſſembly of the wiſe men, and was applied to the great council of the nation, of latter days called the parliament.

WITEPSKI, the capital of the palatinate of the ſame name, in the dutchy of Lithuania, in Poland: eaſt long. 30°, north lat. 56°.

WITHAM, a market-town of Eſſex, ten miles north eaſt of Chelmsford.

WITHERNAM, in law, a writ that lies where a diſtreſs is driven out of the county, and the ſheriff cannot make deliverance to the party diſtrained; in that caſe this writ is directed to the ſheriff, commanding him to take as many of the beaſts, or goods, of the party into his keeping, till he make deliverance of the firſt diſtreſs.

WITHERS of a horſe, the juncture of the ſhoulder-bones at the bottom of the neck and main, towards the upper part of the ſhoulder.

WITNESS, in law, a perſon who gives evidence in any cauſe, and is ſworn to ſpeak the truth, the whole truth, and nothing but the truth.

A witneſs ought to be indifferent with reſpect to each party; for if he will be a gainer or loſer by the ſuit, he is not ſworn as a witneſs. See EVIDENCE.

Falſe witneſſes, ſuborners of witneſſes, *&c.* are in England puniſhed with the pillory; in ſeveral other countries with death. See the articles PERJURY, SUBORDINATION, *&c.*

WITNEY, a market-town of Oxfordſhire, ſeven miles weſt of Oxford. Here is the greateſt manufacture of blankets in England.

WITTENBURG, a city of Germany, in the circle of upper Saxony, fifty miles north of Dreſden.

WITTENBURG, is alſo a town of Germany, in the marquiſate of Brandenburg, ſixty miles north of the city of Brandenburg.

WITTLESEYMERE, a lake in the iſle of Ely, on the confines of Huntingdonſhire, ſix miles long and three broad.

WITTIMUND, a town of Germany, in the circle of Weſtphalia, fifteen miles north of Embden.

WIVELSCOMB, a market-town of Somerſetſhire, ſituated twenty-ſeven miles ſouth weſt of Wells.

WOAD, *iſatis*, in botany. See ISATIS. This is a drug uſed by the dyers to give a blue colour. It ariſes from ſeed ſown annually in the ſpring, which puts forth leaves reſembling thoſe of rib-wort plantain.

tain. These plants have usually three, four, or five crops of leaves every year, of which the first is the best, and the rest in their order. When the leaves are ripe, they gather them, and carry them to a woad-mill to grind them small; after which they are laid eight or ten days on heaps, and are at length made into a kind of balls, which are laid in the shade on hurdles to dry. This done, they break or grind them to powder; which is then spread on a floor and watered. Here they let it smoak and heat, till by torrifying it every day it becomes quite dry.

A woad-blue is a very deep blue, almost black; and is the base of so many sorts of colours, that the dyers have a scale by which they compose the several casts or degrees of woad, from the brightest to the deepest.

WOBURN, a market-town of Bedfordshire, ten miles south of Bedford.

WOERDEN, a town of the United Provinces, in the province of Holland, eighteen miles south of Amsterdam.

WOLAW, the capital of a dutchy of the same name, in Bohemia: east long. 16° 38′, north lat. 51° 22′.

WOLD, signifies a plain down, or open champain ground, hilly and void of wood.

WOLD, or WELD, among dyers. See the article WELD.

WOLF, *lupus*, in zoology, the canis, with the tail bending inward. See the article CANIS.

The wolf is a very large and a very fierce animal, being equal to the biggest mastiff in size, and having much of the general appearance of that creature: the head is large and fleshy: the eyes are large and prominent, and their iris hazel: the ears are short, patulous, and erect: the teeth are very large, and the animal has a way of shewing them in a frightful manner, by grinning: the neck is robust and thick: the body is large, and the back broad: the legs are very robust: the tail is long and bushy: the natural colour is black, but there are some tawny; and in some places they are in winter perfectly white. The wolf is a very mischievous creature, destroying cattle; and in hard winters attacking houses and villages in whole troops.

Sea-WOLF, in ichthyology. See the article LUPUS.

WOLFEMBUTTLE, a city of Germany, in the circle of lower Saxony, and dutchy of Brunswick: east long. 10° 32′, north lat. 52° 20′.

WOLFERDYKE, an island of the united Netherlands, in the province of Zealand, situated between the islands of north Beveland and south Beveland.

WOLFESHEAD, or WOLFERHEFOD, denoted the condition of such persons as were outlawed in the time of the Saxons; who, if they could not be taken alive, so as to be brought to justice, might be slain, and their heads brought to the king; for the head of one of these was no more accounted of than a wolf's head. See OUTLAWRY.

WOLGA, a large river of Russia, which rising in the north of that empire, runs south-east till it falls into the Caspian sea, about fifty miles below Astracan, after its having run a course of between two and three thousand miles.

WOLGAST, a city and port-town of Germany, in the circle of upper Saxony, and dutchy of Pomerania, subject to Sweden: east long 14° 5′, north lat. 54° 12′.

WOLKOWSKA, a city of Poland, in the dutchy of Lithuania, and palatinate of Novogrodeck: east long. 24°, north lat. 53°.

WOLLIN, a town and island of Pomerania, situated in the Baltic sea, at the mouth of the river Oder, subject to the king of Prussia.

WOLODOMIR, the capital of a province of the same name in Russia: east long. 30° 5′, north lat. 57° 40′.

WOLOGDA, the capital of a province of the same name in Russia, situated on the river Dwina: east long. 42° 20′, north lat. 59°.

WOLVERHAMPTON, a market-town of Staffordshire, eleven miles south of Stafford.

WOLVES TEETH, of an horse, are overgrown grinders, the points of which being higher than the rest, prick his tongue and gums in feeding, so as to hinder his chewing. They are seldom met with in any besides young horses; but if they be not daily worn by chewing, they will grow up even to pierce the roof of the mouth.

WOMAN, *fœmina*, in zoology, the female of man. See MAN.

Women, from the very frame and constitution of their bodies, are liable to several diseases, which are peculiar to that sex, arising from a suppression or immoderate flux of the menses, from preg-

nancy, delivery, their milk, &c. all which may be found under their ſeveral articles; as MENSES, FLUOR ALBUS, ABORTION, MILK, &c.

For the engliſh laws in relation to women, ſee the articles COVERTURE, BARON *and feme*, PARAPHERNALIA, WIFE, &c.

WOMB, *uterus*. See UTERUS.

WONDER. See the article MIRACLE.

The ſeven wonders of the world, as they are popularly called, were the egyptian pyramids; the mauſoleum erected by Artemiſia; the temple of Diana, at Epheſus; the walls and hanging gardens of the city of Babylon; the coloſſus, or brazen image of the ſun, at Rhodes; the ſtatue of Jupiter Olympius; and the pharos, or watch-tower, of Ptolemy Philadelphus. See the articles PYRAMID, MAUSOLEUM, COLOSSUS, PHAROS, &c.

WOOD, *lignum*, a ſolid ſubſtance, whereof the trunks and branches of trees conſiſt. See the articles TREE, TRUNK, BRANCH, UNDERWOOD, &c.

The wood is all that part of a tree included betwen the bark and the pith. See the article BARK.

Dr. Grew, in his Anatomy of Plants, has diſcovered, by means of the microſcope, that what we call wood in a vegetable, notwithſtanding all its ſolidity, is only an aſſemblage of infinite minute canals, or hollow fibres, ſome of which riſe from the root upwards, and are diſpoſed in form of a circle; and the others, which he calls inſertions, tend horizontally from the ſurface to the center; ſo that they croſs each other, and are interwoven like the threads of a weaver's-web. See the articles VEGETATION, SAP, &c.

Notwithſtanding this, M. Buffon obſerves, that the organization of wood is yet unknown in all its parts; and that, though the world is greatly indebted to the obſervations of Grew, Malpighi, and Hales, yet when he entered on the ſubject, he found there was much more unknown than known; and determined to obſerve, from its firſt ſtate, the growth of trees, and the formation of their woody part. For this ingenious author's expoſition of the texture, &c. of wood, and thence his calculation of the force and ſtrength of timber uſed in building, we muſt refer the reader to his paper upon that ſubject, as publiſhed in the Memoirs Acad. Par. for the year 1740, and to what has been ſaid under the article TIMBER.

Mortimer obſerves that all kinds of wood are to be preſerved from the worm, and from many other occaſions of decay, by oily ſubſtances, particularly the eſſential oils of vegetables. Oil of ſpike is excellent; and oil of juniper, turpentine, or any other of this kind, will ſerve the purpoſe; theſe will preſerve tables, inſtruments, &c. from being eaten to pieces by theſe vermin; and linſeed oil will ſerve, in many caſes, to the ſame purpoſe; probably nut-oil will do alſo, and this is a ſweeter oil, and a better varniſh for wood.

Some of the weſt indian trees afford a ſort of timber which, if it would anſwer in point of ſize, would have great advantages over any of the european wood in ſhip building for the merchant ſervice, no worm ever touching this timber. The acajou, or tree which produces the caſhew nut, is of this kind; and there is a tree of Jamaica, known by the name of the white-wood, which has exactly the ſame property; and ſo have many other of their trees.

To ſeaſon wood expeditiouſly for ſea-ſervice, Mr. Boyle obſerves, that it has been uſual to bake it in ovens.

The art of moulding wood is mentioned by Mr. Boyle as a deſideratum in the art of carving. He ſays, he had been credibly informed of its having been practiſed at the Hague; and ſuſpects that it might have been performed by ſome menſtruum that ſoftens the wood, and afterwards allows it to harden again, in the manner that tortoiſe-ſhell is moulded: or, perhaps, by reducing the wood into a powder, and then uniting it into a maſs with ſtrong but thin glue. And he adds, that, having mixed ſaw-duſt with a fine glue made of iſing glaſs, ſlightly ſtraining out what was ſuperfluous through a piece of linnen, the remainder, formed into a ball and dried, became ſo hard as to rebound when thrown againſt the floor.

The people who work much in wood, and that about ſmall works, find a very ſurpriſing difference in it, according to the different ſeaſons at which the tree was cut down, and that not regularly the ſame in regard to all ſpecies, but different in regard to each. The button mould makers find that the wood of the pear-tree, cut in ſummer, works toughеſt; holly, on the contrary, works toughеſt when

when cut in winter; box is melloweſt when it has been cut in ſummer, but hardeſt when cut about Eaſter; haw-thorn works meſſow when cut about October, and the ſervice is always tough, if cut in ſummer.

Wood uſed for fuel is required of various kinds, in regard to the various works to be performed by it.

Neri every where commends oak for the wood to be burnt in the glaſs-houſes, as the propereſt wood for making a ſtrong and durable fire with a good flame.

Imperato, on the contrary, commends aſh on the ſame occaſion; becauſe, as he ſays, it gives a ſubſtantial, rather than a great flame: and Camerarius deſervedly commends juniper wood, as affording a laſting, ſtrong, and ſweet fire, could plenty of it be had. Among the antients, Pliny commends light dry wood; and Plutarch, the tameriſk in particular, for making the glaſs-houſe fires; but glaſs-making requires ſo great a fire as cannot be eaſily made from ſuch wood. Nor can aſh be proper, becauſe, though it gives a good fire, it ſoon decays.

Woods are diſtinguiſhed into divers kinds, with regard to their nature, properties, virtues, and uſes. Of wood, conſidered according to its qualities, whether uſeful, curious, medicinal, &c. the principal is called timber, uſed in building houſes, laying floors, roofs, ma hines, &c. See TIMBER.

Woods valued on account of their curioſity are cedar, ebony, box, calambo, &c. which by reaſon of their extraordinary hardneſs, agreeable ſmell, or beautiful poliſh, are made into tables, combs, beads, &c. See EBONY, &c.

The medicinal woods are guaiacum, aloes, ſaſſafras, nephriticum, ſantal, ſarſaparilla, aſpalathum, &c. See the articles GUAIACUM, ALOES, SASSAFRAS, &c.

Woods uſed in dying are the indian-wood, brazil wood, campechy wood, &c. See BRAZIL, &c.

Foſſile WOOD. Foſſile wood, or whole trees, or parts of them, are very frequently found buried in the earth, and that in different ſtrata; ſometimes in ſtone, but more uſually in earth; and ſometimes in ſmall pieces looſe among gravel. Theſe, according to the time they have lain in the earth, or the matter they have lain among, and in the way of, are found differently altered from their original ſtate; ſome of them having ſuffered very little change, and others being ſo highly impregnated with cryſtalline, ſparry, pyritical, or other extraneous matter, as to appear mere maſſes of ſtone, or lumps of the common matter of the pyrites, &c. of the dimenſions, and, more or leſs, of the internal figure of the vegetable bodies into the pores of which they have made their way.

The foſſile-wood, which we find at this day, are, according to theſe differences, arranged, by Dr. Hill, into three kinds; 1. the leſs altered: 2. the pyritical: and, 3. the petrified.

Of the trees, or parts of them, leſs altered from their original ſtate, the greateſt ſtore is found in digging to ſmall depths in bogs, and among what is called peat or turf-earth, a ſubſtance uſed in many parts of the kingdom for fuel. In digging among this, uſually very near the ſurface, they find immenſe quantities of vegetable matter buried, and that of various kinds: in ſome places there are whole trees ſcarce altered, except in colour; the oaks in particular being uſually turned to a jetty black; the pines and firs, which are alſo very frequent, are leſs altered, and are as inflammable as ever, and often contain, between the bark and wood, a black reſin. Large parts of trees have alſo been not unfrequently met with unaltered in beds of another kind, and at much greater depths, as in the ſtrata of clay and loam, among gravel, and ſometimes even in ſolid ſtone.

Beſide theſe harder parts of trees, there are frequently found alſo in the peat-earth, vaſt quantities of the leaves and fruit, and catkins of the hazel, and the like trees: theſe are uſually intermixed among the ſedge and roots of graſs, and are ſcarce at all altered from their uſual texture. The moſt common of theſe are hazel nuts; but there are frequently found alſo the twigs and leaves of the white poplar; and a little deeper uſually there lies a cracked and ſhattered wood, the crevices of which are full of a bituminous black matter; and among this the ſtones of plumbs, and other ſtone-fruits, are ſometimes found, but that more rarely.

It is idle to imagine, that theſe have been thus buried either at the creation; or, as many are fond of believing, at the univerſal deluge: at the firſt of theſe times the ſtrata muſt have been formed

before the trees were yet in being; and the peat-wood is ſo far from being of antediluvian date, that much of it is well known to have been growing within theſe three hundred years, in the very places where it is now found buried.

In this ſtate, that is little altered from their original condition, it is, that the fruits, and larger parts of trees are uſually found: what we find of them more altered, are ſometimes large and long, ſometimes ſmaller and ſhorter, branches of trees; ſometimes ſmall fragments of branches, and more frequently ſmall ſhapeleſs pieces of wood. The larger and longer branches are uſually found bedded in the ſtrata of ſtone, and are more or leſs altered into the nature of the ſtratum they lie in; the ſhorter and ſmaller branches are found in vaſt variety in the ſtrata of blue clay, uſed for making tiles in the neighbourhood of London; theſe are prodigiouſly plentiful in all the clay-pits of this kind, and uſually carry the whole external reſemblance of what they once were, but nothing of the inner ſtructure; their pores being wholly filled, and undiſtinguiſhably cloſed by the matter of the common vitriolic pyrites, ſo as to appear mere ſimple maſſes of that matter. Theſe fall to pieces on being long expoſed to a moiſture, and are ſo pregnant in vitriol that they are what is principally uſed for making the green vitriol or copperas at Deptford, and other places. See VITRIOL and COPPERAS.

The irregular maſſes or fragments of wood, are principally of oak, and are moſt uſually found among gravel; tho' ſometimes in other ſtrata. Theſe are variouſly altered by the inſinuation of cryſtalline and ſtony particles, and make a very beautiful figure when cut and poliſhed, as they uſually keep the regular grain of the wood, and ſhew exactly the ſeveral circles which mark the different years growth. Theſe, according to the different matter which has filled their pores, aſſume various colours, and the appearance of the various foſſils that have impregnated them; ſome are perfectly white, and but moderately hard; others of a browniſh black, or perfectly black, and much harder; others of a reddiſh black, others yellowiſh, and others greyiſh, and ſome of a ferrugineous colour. They are of different weights alſo and hardneſſes, according to the nature and quantity of the ſtony particles they contain; of theſe ſome pieces have been found with every pore filled with pure pellucid cryſtal; and others in large maſſes, part of which is wholly petrified and ſeems mere ſtone, while the reſt is crumbly and is unaltered wood. That this alteration is made in wood, even at this time, is alſo abundantly proved by the inſtances of wood being put into the hollows of mines, as props and ſupports to the roofs, which is found after a number of years as truly petrified as that which is dug up from the natural ſtrata of the earth. In the pieces of petrified wood found in Germany, there are frequently veins of ſpar or of pure cryſtal, ſometimes of earthy ſubſtances, and often of the matter of the common pebbles: theſe fragments of wood ſometimes have the appearance of parts of the branches of trees in their natural ſtate; but more frequently they reſemble pieces of broken boards; theſe are uſually capable of a high and elegant poliſh.

Many ſubſtances, it is certain, have been preſerved in the cabinets of collectors, under the title of petrified wood, which have very little right to that name. But where the whole outer figure of the wood, the exact lineaments of the bark, or the fibroſe and fillular texture of the ſtriæ, and the veſtiges of the utriculi and tracheæ, or air-veſſels, are yet remaining, and the ſeveral circles yet viſible, which denoted the ſeveral years growth of the tree, none can deny theſe ſubſtances to be real foſſil-wood.

Cord of WOOD. See CORD *of Wood.*

Cutting in WOOD. See CUTTING.

Meaſure of WOOD. See MEASURE.

Painting on WOOD, *&c.* See the article PAINTING, *&c.*

WOOD, *ſylva*, in geography, a multitude of trees extended over a large continued track of land, and propagated without culture. The generality of woods only conſiſt of trees of one kind.

The ancient Saxons had ſuch a veneration for woods, that they made them ſanctuaries.

It is ordained, that none ſhall deſtroy any wood, by turning it into tillage or paſture, *&c.* where there are two acres or more in quantity, on pain of forfeiting 40 s. an acre, by 35 Hen. VIII. *c.* 17. All woods that are felled at fourteen years growth, are to be preſerved from deſtruction for eight years; and no cattle put into the ground till five years after the felling thereof, *&c.* 13 Eliz. *c.* 25. The burning of woods, or under-

wood,

wood, is declared to be felony; alſo thoſe perſons that maliciouſly cut or ſpoil timber-trees, or any fruit-trees, *&c.* ſhall be ſent to the houſe of correction, there to be kept three months, and whipt once a month.

WOODBRIDGE, a market-town of Suffolk, ſituated twenty-ſix miles ſouth-eaſt of Bury.

WOOD-COCK, *ſcolopax*, in ornithology. See the article SCOLOPAX.

WOOD-COCK-SHELL, in natural hiſtory, the variegated yellowiſh purpura, with tubercles, and a long beak; and the thorny wood-cock-ſhell is the yellow long beaked purpura, with long and crooked ſpines. See PURPURA.

WOOD-CORN, is ſaid to be corn given by the tenants of ſome manors to the lords for the liberty to gather up wood, and the feeding of cattle, there.

WOOD-COPPICE. See COPPICE.

WOOD and WOOD, in the ſea-language, is when two pieces of timber are ſo let into each other, that the wood of the one joins cloſe to the other.

WOOD GELD, or WOODGELDUM, in our antient cuſtoms, the gathering or cutting of wood within the foreſt; or it may denote the money paid for the ſame to the foreſters. Sometimes it alſo ſeems to ſignify an immunity from this payment by the king's grant.

WOOD-HAY, an antient cuſtom at Exeter, whereby a log out of every ſeam of wood over Ex-bridge is taken, towards the reparation of that bridge.

WOOD-LOUSE, in zoology a name given to ſeveral ſpecies of oniſcus. See the article ONISCUS.

The common wood-louſe, or millepes, is the oniſcus with a blunt forked tail. See the article MILLEPES.

The black wood-louſe is the oniſcus with an obtuſe unidivided tail, growing to an inch in length, and being of an oval figure; and the ſea-wood-louſe is the oniſcus, with a ſubulated tail, appendiculated on each ſide.

WOOD MOTE, the antient name of that foreſt-court, now called the court of attachment. See ATTACHMENT and FOREST.

WOOD-PLEA COURT, a court held twice a year in the foreſt of Clun, in Shropſhire, for determining all matters relating to wood.

WOOD-PECKER, *Picus*, in ornithology, a genus of birds with the beak ſtraight, of a polyhedral or many-ſided figure, and with its point formed in the manner of a wedge; the tongue is rounded and very long, it reſembles in form a worm, or ſome other ſuch inſect; the toes, in all but one ſpecies, ſtand two before and two behind, as in the parrot. This genus comprehends the great black wood-pecker, with a ſcarlet head, in ſize ſomewhat larger than that of a fieldfare; the green wood-pecker, with a ſcarlet crown; the great ſpotted wood-pecker, with a black head, and ſome of the tail-feathers white; the leſſer ſpotted wood-pecker, with three lateral rectrices, variegated with white at top; the middle ſpotted wood-pecker, with three lateral rectrices, half black; the three toed wood-pecker, with only three toes; the braſilian wood-pecker, or ipecu, with a ſcarlet creſted head; and the golden wood-pecker, or the yellow picus. There are various other ſpecies of wood-peckers, as the brown picus, ſpotted with yellow; the black picus, with the wings and tail yellow, *&c.*

WOODSTOCK, a borough-town of Oxfordſhire, ſituated ſeven miles north of Oxford.

It ſends two members to parliament.

WOODWARD, an officer of the foreſt, whoſe function it is to look after the woods, and obſerve any offences either in vert or in veniſon, committed within his charge, and to preſent the ſame; and in caſe any deer are found killed, or hurt, to inform the verderer thereof, and to preſent them at the next court of the foreſt. See FOREST.

WOOF, among manufacturers, the threads which the weavers ſhoot acroſs with an inſtrument called the ſhuttle. See the articles SHUTTLE, WARP, WEB, WEAVING, CLOTH, *&c.*

The woof is of different matter, according to the piece to be wrought. In taffety, both woof and warp are ſilk. See the article TAFFETY.

In mohairs, the woof is uſually wool, and the warp ſilk. In ſattins, the warp is frequently flax, and the woof ſilk. See SERGE, SATTIN, VELVET, *&c.*

WOOL, the covering of ſheep. See the article SHEEP.

Each fleece conſiſts of wool of ſeveral qualities and degrees of fineneſs, which the dealers therein take care to ſeparate. The Engliſh and French uſually ſeparate each fleece into three principal ſorts, *viz.*

1. Mother-

1. Mother-wool, which is that of the back and neck. 2. The wool of the tails and legs. 3. That of the breaſt and under the belly. The wool moſt eſteemed is the Engliſh, chiefly that about Leominſter, Cotswold, and the Iſle of Wight; the Spaniſh, principally that about Segovia; and the French, about Berry.

The fineneſs and plenty of our wool is owing in a great meaſure to the ſhort ſweet graſs in many of our paſtures and downs; though the advantage of our ſheeps feeding on this graſs all the year, without being obliged to be ſhut up under cover during the winter, or to ſecure them from wolves at other times, contributes not a little to it.

Antiently, the principal commerce of the nation conſiſted in wool unmanufactured; which foreigners, eſpecially the French, Dutch, and Flemiſh, bought of us, inſomuch, that the cuſtoms paid on wool exported in the reign of Edward III. amounted, at 50s. a pack, to 250,000l. per annum. An immenſe ſum in thoſe days! But as wool is now accounted a ſtaple commodity, the employment of an infinite number of people at home, and our moſt beneficial trade abroad, depending upon it, very ſevere laws have been made to prevent its being exported, and perſons that export wool beyond the ſeas, are liable to a forfeiture of the ſhips or veſſels in which it is found, with treble the value, and the perſons aiding and aſſiſting in it ſhall ſuffer three years impriſonment. It is alſo enacted, that no ſheep ſhall be carried on board any ſhip with intent to be exported, upon forfeiture of 20s. for every ſheep; that the owners knowing thereof, are to forfeit their intereſt therein; that if they be aliens, or natural born ſubjects not inhabiting this kingdom, ſuch ſhips ſhall be wholly forfeited; that the maſters and mariners knowing thereof, and aſſiſting therein, are to forfeit all their goods and chattels, and to ſuffer three months impriſonment; and that the exporter, beſides other penalties, ſhall be rendered incapable of ſuing for any debt, &c. As to the importation of wool, Iriſh wool, combed or uncombed, Spaniſh and Poliſh wool may be imported duty to free.

WOOL, is alſo uſed for the ſoft hair growing on ſeveral wild beaſts, the ſkins of which are diſtinguiſhed by the name of furrs. See the article FURR.

Theſe kinds of wool, on being imported, pay the following duties: bever-wool, cut and combed, 14s. $\frac{3}{4}$d. the pound the whole of which is drawn back on exportation: but if this wool be combed in Ruſſia, and imported from thence in britiſh ſhips, it is free. Coney-wool, the pound, 1 $\frac{43\frac{5}{8}}{100}$d. draw back 1 $\frac{29\frac{3}{8}}{100}$d. Eſtridge wool, imported in britiſh-built ſhips, free; but if imported in thoſe that are foreign built, it pays 6s. $8\frac{43}{100}$d. the 112 pounds: draw back, 6s. $\frac{45}{100}$d. Stanes-wool, the pound $7\frac{13}{16}$d. draw back $6\frac{11}{16}$d.

For the divers preparations of wool, ſee CARDING, COMBING, SPINNING, WEAVING, FULLING, CLOTH, &c.

Cotton-WOOL. See the article COTTON.

WOOL-STAPLE, denotes a city or town where wool uſed to be ſold. See the article STAPLE.

WOOL-WINDERS, are perſons employed in winding up fleeces of wool into bundles to be packed and ſold by weight. Thoſe are ſworn to do it truly between the owner and the merchant.

Pocket of WOOL. See POCKET.

Salplar of WOOL. See SALPLAR.

WOOLEN MANUFACTORY, includes the ſeveral ſorts of commodities into which wool is wrought, as broad cloth, long and ſhort kerſeys, bays, ſerges, flannel, perpetuanas, ſays, ſtuffs, frize, penniſtones, ſtockings, caps, rugs, &c. See the article CLOTH, &c.

WOOLSTED. See the article WORSTED.

WOOLWICH, a market town of Kent, ſituated on the river Thames, ſix miles eaſt of London.

WORCESTER, the capital city of Worceſterſhire, ſituated on the river Severn, 110 miles north-weſt of London: weſt long. 2° 15′, north lat. 52° 5′.

WORCUM, a town of Holland, ſituated on the river Waal, twenty-three miles eaſt of Rotterdam. This is alſo the name of a port-town of the united Netherlands, ſituated in the province of Friezland, on the Zuyder-Sea, twenty miles ſouth-weſt of Lewarden.

WORD, in language, an articulate ſound deſigned to repreſent ſome idea. See SOUND, VOICE, SIGN, IDEA, &c.

The port-royaliſts define words to be diſtinct articulate ſounds, agreed on by mankind

mankind to convey their thoughts and ſentiments by. See LANGUAGE.

Word, in writing, is defined to be an aſſemblage of ſeveral letters forming one or more ſyllables, and expreſſing the name, quality, or manner of a thing. See the articles LETTER, SYLLABLE, QUALITY, *&c.*

Etymology and ſyntax being the two parts of grammar converſant about words, the firſt of theſe explains the nature and propriety of words, and the other treats of the right compoſition of words in diſcourſe. See GRAMMAR, ETYMOLOGY, *&c.*

The moſt remarkable thing in the pronouncing of words, is the accent, or the elevation of the voice, on ſome particular ſyllable of the word, which elevation is neceſſarily followed by a depreſſion of the voice. See the article ACCENT.

Grammarians generally divide words into eight claſſes, called parts of ſpeech. See SPEECH, and PARTS *of Speech.*

Words are again divided into primitives and derivatives, ſimple and compound, ſynonymous and equivocal. See the article PRIMITIVE, *&c.*

With regard to their ſyllables, words are farther divided into monoſyllables and polyſyllables. See MONOSYLLABLE and POLYSYLLABLE.

The grammatical figures of words which occaſion changes in the form, *&c.* thereof are proſthetis, aphæreſis, ſyncope, epentheſis, apocope, paragoge, craſis, diæreſis, metatheſis, and antitheſis. See PROSTHESIS, *&c.*

The uſe of words, we have obſerved, is to ſerve as ſenſible ſigns of our ideas; and the ideas they ſtand for in the mind of the perſon that ſpeaks, are their proper ſignifications. See the articles SIGN, SEMEIOTICA, SCIENCE, *&c.*

Simple and primitive words have no natural connection with the things they ſignify, whence there is no rationale to be given of them; it is by mere arbitrary inſtitution and agreement of men, that they come to ſignify any thing. Certain words have no natural propriety or aptitude to expreſs certain thoughts more than others; were that the caſe there could have been but one language. But in derivative, and compound words the caſe is ſomewhat different. In the forming of theſe, we ſee regard is had to agreement, relation, and analogy; thus moſt words that have the ſame ending, have one common and general way of denoting or ſignifying things; and thoſe compounded with the ſame prepoſitions, have a ſimilar manner of expreſſing and ſignifying ſimilar ideas, in all the learned languages where they occur.

For the perfection of language, it is not enough, Mr. Locke obſerves, that ſounds can be made ſigns of ideas, unleſs theſe can be made uſe of ſo as to comprehend ſeveral particular things; for the multiplication of words would have perplexed their uſe, had every particular thing needed a diſtinct name to be ſignified by. To remedy this inconvenience, language had a further improvement in the uſe of general terms, whereby one word was made to mark a multitude of particular exiſtences; which advantageous uſe of ſounds was obtained by the difference of the ideas they were made ſigns of, thoſe names becoming general which are made to ſtand for general ideas, and thoſe remaining particular, where the ideas they are uſed for are particular. See the articles TERMS, GENERAL, ABSTRACT, *&c.*

It is obſervable, that the words which ſtand for actions and notions, quite removed from ſenſe, are borrowed from ſenſible ideas; as to imagine, apprehend, comprehend, underſtand, adhere, conceive, inſtil, diſguſt, diſturbance, tranquillity, *&c.* which are all taken from the operations of things ſenſible, and applied to modes of thinking. Spirit, in its original ſignification, is no more than breath; angel, a meſſenger. By which we may gueſs what kind of notions they were, and whence derived, which filled the minds of the firſt beginners of languages; and how nature, even in the naming of things unawares, ſuggeſted to men the originals of all their knowledge: whilſt to give names that might make known to thers any operations they felt in themſelves, or any other ideas that came not under their ſenſes, they were forced to borrow words from the ordinary and known ideas of ſenſation. See SENSATION, PERCEPTION, *&c.*

The ends of language, in our diſcourſe with others, are chiefly three; firſt, to make our thoughts or ideas known one to another. This we fail in, 1. when we uſe names without clear and diſtinct ideas in our mind. 2. When we apply received names to ideas, to which the common uſe of that language doth not apply them. 3. When we apply them unſteadily, making them ſtand now for one,

one, and anon for another idea. Secondly, to make known our thoughts with as much eaſe and quickneſs as poſſible. This men fail in, when they have complex ideas, without having diſtinct names for them, which may happen either through the defect of a language which has none, or the fault of the man who has not yet learned them. Thirdly, to convey the knowledge of things. This cannot be done but when our ideas agree to the reality of things. He that has names without ideas, wants meaning in his words, and ſpeaks only empty ſounds. He that has complex ideas without names for them, wants diſpatch in his expreſſion. He that uſes his words looſely and unſteadily, will either not be minded or not underſtood. He that applies names to ideas, different from the common uſe, wants propriety in his language, and ſpeaks gibberiſh; and he that has ideas of ſubſtances diſagreeing with the real exiſtence of things, ſo far, wants the materials of true knowledge. See the articles IDEA and KNOWLEDGE.

WORD, or *Watch*-WORD, in an army or garriſon, is ſome peculiar word or ſentence, by which the ſoldiers know and diſtinguiſh one another in the night, *&c.* and by which ſpies and deſigning perſons are diſcovered. It is uſed alſo to prevent ſurprizes. The word is given out in an army every night to the lieutenant, or major-general of the day, who gives it to the majors of the brigades, and they to the adjutants; who give it firſt to the field-officers, and afterwards to a ſerjeant of each company, who carry it to the ſubalterns. In garriſons it is given after the gate is ſhut to the town-major, who gives it to the adjutants, and they to the ſerjeants. See ROUNDS.

WORD, in heraldry, *&c.* See MOTTO.

WORDS, in law, which may be taken in a common ſenſe, ſhould not receive a ſtrained or unuſual conſtruction; and ſuch as are ambiguous, are to be conſtrued ſo as to make them ſtand with law and equity, neither may they be wreſted to do wrong: nevertheleſs the different placing of the ſame words, may cauſe them to have a different meaning; alſo where words are either ſenſeleſs or needleſs in a deed, they ſhall do no hurt, if the ſame is good and perfect without thoſe words.

WORK, in the manege. To work a horſe, is to exerciſe him at pace, trot, or gallop, and ride him at the manege. To work a horſe upon volts, or head and haunches in or between two heels, is to paſſage him, or make him go ſide-ways upon two parallel lines.

WORK-HOUSE. See *Work*-HOUSE.

WORKS, *opera*, in fortification, the ſeveral lines, trenches, ditches, *&c.* made round a place or army, or the like, to fortify and defend it. See FORTIFICATION, LINE, TRENCH, *&c.*

For the ſeveral ſorts of works, as clock-work, fire work, fret-work, horn work, ruſtic-work, wax-work, *&c.* See the articles CLOCK-*work*, FIRE-*work*, &c.

WORKSOP, a market-town of Nottinghamſhire, ſituated twenty miles north of Nottingham.

WORLD, *mundus*, the aſſemblage of parts which compoſe the univerſe. See the article UNIVERSE.

The duration of the world is a thing which has been greatly diſputed. Plato, after Ocellus Lucanus, held it to be eternal, and to have flowed from God as rays flow from the ſun. Ariſtotle was much of the ſame mind; he aſſerts, that the world was not generated ſo as to begin to be a world, which before was none: he lays down a pre-exiſting and eternal matter as a principle, and thence argues the world eternal. His arguments amount to this, that it is impoſſible an eternal agent, having an eternal paſſive ſubject, ſhould continue long without action. His opinion was generally followed, as ſeeming to be the fitteſt to end the diſpute among ſo many ſects about the firſt cauſe. See the articles MATTER, CAUSE, and PERIPATETIC *Philoſophy*.

Epicurus, however, though he makes matter eternal, yet ſhews the world to be but a new thing formed out of a fortuitous concourſe of atoms. See the articles ATOMICAL and EPICUREAN.

Some of the modern philoſophers refute the imaginary eternity of the world by this argument, that if it be *ab eterno*, there muſt have been a generation of individuals in a continual ſucceſſion from all eternity, ſince no cauſe can be aſſigned why they ſhould not be generated, *viz.* one from another. Therefore to conſider the origin of things, and the ſeries of cauſes, we muſt go back in infinitum, *i.e.* there muſt have been an infinite number of men and other individuals already generated, which ſubverts the very notion of number. And if the cauſe which

which now generates has been produced by an infinite ſeries of cauſes, how ſhall an infinite ſeries be finite? Dr. Halley ſuggeſts a new method of finding the age of the world from the degree of the ſaltneſs of the ocean. See SEA.

Syſtem of the WORLD. See SYSTEM.

WORMS, in the linnæan ſyſtem of nature, a claſs of inſects of the order of the apteria, and of the claſs of the anarthra. See APTERIA and ANARTHRA.

The diſtinguiſhing character of this claſs is, that they have the muſcles of their body affixed to a ſolid baſis. The ſeveral ſpecies of worms are very numerous; as to the chætia, or the hair worm, called alſo the guinea-worm; the aſcaris, the lumbricus, or earth-worm; and ſea-worm; the tænia or tape-worm; the ſicyania or gourd-worm; the iulus or gally-worm, *&c.* See CHÆTIA, *&c.*

WORMS, in huſbandry, are very prejudicial to corn-fields, eating up the roots of the young corn, and deſtroying great quantities of the crop. Sea-ſalt is the beſt of all things for deſtroying them. Sea-water is proper to ſprinkle on the land, where it can be had; where the ſalt-ſprings are, their water will do; and where neither are at hand, a little common or bay-ſalt does as well. Soot will deſtroy them in ſome lands, but is not to be depended upon, for it does not always ſucceed. Some farmers ſtrew on their lands a mixture of chalk and lime; and others truſt wholly to their winter-fallowing to do it, if this is done in a wet ſeaſon, when they come up to the ſurface of the ground, and ſome nails with ſharp heads be driven into the bottom of the plough. If they are troubleſome in gardens, the refuſe brine of ſalted meat will ſerve the purpoſe, or ſome walnut leaves ſteeped in a ciſtern of water for a fortnight or three weeks, will give it ſuch a bitterneſs that it will be a certain poiſon to them. A decoction of wood-aſhes, ſprinkled on the ground, will anſwer the ſame purpoſe; and any particular plant may be ſecured both from worms and ſnails by ſtrewing a mixture of lime and aſhes about its roots. It is a general caution among the farmers to ſow their corn as ſhallow as they can, where the field is very ſubject to worms.

Generation of WORMS. See the article GENERATION.

WORMS, in medicine, a diſeaſe ariſing from ſome of theſe reptiles being engendered in the body, particularly in the ſtomach and inteſtines.

When children begin to uſe crude aliments, ſummer fruits, fleſh, cheeſe, and other things of the like kind, they are frequently troubled with the worms, occaſioned by the eggs of inſects, which either float in the air, or live on the earth, and which being caſually ſwallowed, are not digeſtible by their tender ſtomachs. For theſe, the inteſtinal or gaſtric pituit, afford a neſt in which they reſide, are nouriſhed, breed, and increaſe in bulk. Hence they are not ſo common in adults, except in the dull and ſluggiſh, and in the leuco-phlegmatic.

There are three ſpecies of worms, moſt frequent in the human body; the lumbrici, the aſcarides, and the tænia. The lumbrici are found in the ilion, and are thus called, becauſe they are generally broad and long, and roll themſelves up in a ſtrange manner. The aſcarides have their ſeat chiefly in the groſs inteſtines, and are more plentiful in the rectum; they are round and ſmall, and are thrown out in large quantities. The broad worm called tænia, is like a ſwathe, commonly two ells long, but ſometimes much longer, and divided through the whole length with croſs joints or knots. This is ſaid to be always ſingle; and lies variouſly convoluted, being ſometimes as long as all the guts, and ſometimes even vaſtly exceeding that length. Heiſter obſerves, that there are other kinds of inſects, or worms, generated in an human body, which phyſicians have not placed in any particular claſs, but have looked upon them as uncommon productions.

Worms by their irritation, create nauſeas, vomitings, looſeneſſes, faintings; a ſlender, deficient, intermitting pulſe; itching of the noſe, and epileptic fits. By the conſumption of the chyle, they produce hunger, paleneſs, weakneſs, and coſtiveneſs; whence ariſes a tumour of the abdomen, eructations, and rumbling of the inteſtines.

A child may be known to have the worms from his age, cold temperament, paleneſs of the countenance, livid eyelids, hollow eyes, itching of the noſe, voracity, ſtartings, and grinding the teeth in ſleep; and more eſpecially by a ſingular ſtinking breath; but when they are voided by the mouth, or anus, there remains no manner of doubt.

The cure is to be performed chiefly by deſtroying their neſts, which is to be at-

tempted by alkalious ſalts; gums which purge phlegm, mercurials, antimonials, and bitter aromatics.

Guinea-WORMS, *dracunculi*. See the article DRACUNCULI.

WORM, in gunnery, a ſcrew of iron, to be fixed on the end of a rammer, to pull out the wad of a fire-lock, carabine, or piſtol, being the ſame with the wad-hook, only the one is more proper for ſmall arms, and the other for cannon.

WORM, in chemiſtry, is a long, winding, pewter pipe, placed in a tub of water, to cool and condenſe the vapours in the diſtillation of ſpirits.

WORM, a *cable*, or *hawſer*, in the ſea-language, is to ſtrengthen it by winding a ſmall line, or rope, all along between the ſtrands.

WORMS, in geography, an imperial city of Germany, in the palatinate of the Rhine: eaſt long. 8° 5′, north lat. 49° 38′.

WORM-SEED, *ſemen ſantonicum*, is the ſeed of a ſpecies of worm-wood, which grows in the Levant, from whence we have the ſeed, which is there produced in great plenty, without the trouble of ſowing; this plant growing wild in the fields. See WORMWOOD.

The ſeed of this plant is light and chaffy, envenopled with a vaſt many thin membranes, that have the ſame virtue with the ſeed itſelf, and are uſed with it under its name. It is a ſmall and light ſeed, of a pale yellowiſh brown colour, with ſome admixture of greeniſh in it, of an oblong form, ſomewhat larger at the baſe, and tapering to a point at the ſummit. It is of a friable texture, eaſily beat to powder. It has not much ſmell, but is of a bitter taſte. Worm-ſeed is to be choſen large, freſh and clean, not duſty or decayed, or hanging together in cluſters, which is a ſign of inſects being, or having been among it.

Its great virtue is that of deſtroying worms in children; but as it is too bitter to be eaſily ſwallowed by them either in powder or decoction; it is therefore beſt taken by way of comfit covered over with ſugar.

Wormſeed, on being imported, pays a duty of $7\frac{3}{4}$ d. the pound, and draws back, $6\frac{80}{100}$ d.

WORMWOOD, *abſinthium*, in botany. See the article ABSINTHIUM.

Wormwood, beſides the virtues attributed to it under its generical name, is prepared into an oil, and fixed ſalt, the former of which is uſed externally to the belly, to deſtroy worms in the inteſtines, and the latter is a famous febrifuge and ſtomachic.

WORONETS, or VERONESE, a city of Ruſſia, in the province of Belgorod, ſituated on the river Veroneſe, near its confluence with the Don: eaſt long. 40°, north lat. 52°.

WORSHIP *of God*, the offering up of adoration, prayer, praiſe, thankſgiving and confeſſion to God, as our creator, benefactor, law-giver and judge.

Internal piety, or the worſhip of the mind, is that which flows from the heart in devout aſpirations addreſſed to the deity without the uſe of verbal expreſſions uttered in an audible manner. External worſhip is founded on the ſame principles as the internal, and is either private or public. A worſhip that is purely intellectual, is too ſpiritual and abſtracted for the bulk of mankind. The operations of their minds, eſpecially ſuch as are employed on the moſt ſublime objects, muſt be aſſiſted by their outward organs, otherwiſe they will be ſoon diſſipated by ſenſible impreſſions, or grow tireſome if too long continued: for ideas are ſuch fleeting things, that they muſt be fixed; and ſo ſubtle, that they muſt be expreſſed and delineated, as it were, by ſenſible marks and images, otherwiſe we cannot long attend to them. Hence ariſes the neceſſity of external worſhip, which by ſtated acts of devotion, fixes our attention, compoſes and enlivens our thoughts, impreſſes us more deeply with a ſenſe of the awful preſence in which we are, and tends to heighten our devout affections. This holds true in the caſe of public worſhip; for as God is the parent and head of the ſocial ſyſtem, and has formed us for a ſocial ſtate; as there are public bleſſings, and crimes in which we have all, in ſome degree, a ſhare; and public wants and dangers, to which all are expoſed; it is therefore evident, that ſolemn offices of public worſhip are duties of indiſpenſible moral obligation, among the beſt cements of ſociety, the firmeſt prop of government, and the faireſt ornament of both.

WORSTED, a kind of woollen thread, which, in the ſpinning, is twiſted harder than ordinary. It is chiefly uſed either wove or knit into ſtockings, caps, gloves, or the like.

WORSTED, a market-town of Norfolk, ſituated ſeven miles north of Norwich.

WOTTON, a market-town of Glouceſter-

ſhire, ſituated ſeventeen miles ſouth of Glouceſter.

WOTTEN-BASSET a borough-town of Wiltſhire, twenty-five miles north of Saliſbury; which ſends two members to parliament.

WOULDING, a ſea-term for the winding of ropes, round a maſt or yard of a ſhip, that has been ſtrengthened by a piece of timber nailed to it.

WOUND, *vulnus*, in medicine and ſurgery, is frequently defined to be a violent ſolution of the continuity of the ſoft external parts of the body made by ſome inſtrument. Others take a greater latitude in defining it, and call every external hurt of the body, by what cauſe ſoever produced, a wound. On the other hand, ſome are of opinion, that unleſs the injured parts of the body are divided by ſome ſharp inſtrument, as by a ſword or knife, it is by no means to be called a wound; but notwithſtanding, it is certain that thoſe wounds which are produced by blunt inſtruments may properly enough be called wounds, whence Heiſter diſtinguiſhes two different kinds of wounds, the one made by acute, the other by blunt inſtruments.

Wounds are generally inflicted upon the ſofter parts of the human body, ſuch as the ſkin, fat, muſcular fleſh, ligaments, blood-veſſels, and nerves, and parts that are compoſed of theſe, as the viſcera and inteſtines; yet the more ſolid parts of the body are by no means to be here excluded, as the bones, whence the parts that are ſubject to thoſe injuries will afford two diſtinctions of wounds; one, wounds of the ſoft parts, the other, wounds of the bones.

As cauſes of wounds, all inſtruments of what kind ſoever, whether blunt or ſharp, may properly be reckoned, provided they are of ſuch a nature, that upon the violent external application of them, they are capable of producing a ſolution of continuity in the parts of the body upon which they are inflicted; for a ſolution of the external parts, from an internal cauſe, is not called a wound, but rather an abſceſs, or ulcer; ſo when the harder parts of the body, to wit, the bones, are broken by a fall, or a violent blow received from a blunt inſtrument, it is termed a fracture. See the articles ABSCESS, ULCER, FRACTURE, and CONTUSION.

The effects which are produced by wounds, beſides the diviſion of the ſofter parts, are generally profuſions of blood; though they are ſometimes attended with much greater miſchiefs than theſe, for it can ſcarcely happen, but that the divided parts muſt, in ſome meaſure, if not totally, loſe their natural functions, according to the different uſes for which the part is intended, and according to the different degrees of injury that it receives. The greater number of uſes a part is intended for by nature, the worſe will be the conſequences of a wound upon that part; this principle is ſo extenſive, that it is the conſtant guide in forming a prognoſtic, whether the wound will prove mortal or not. He therefore, who is beſt ſkilled in anatomy, that is, beſt inſtructed in the ſituation of the parts, and their uſes, will be enabled to form the moſt accurate judgment of the conſequence that will neceſſarily attend a wound upon any particular part.

What has been ſaid of the different ſituations and cauſes of wounds, ſufficiently demonſtrates, that there are many different kinds of wounds, ſome brought on by a puncture, ſome by a ſtab, and ſome again by a blow; ſome are curable, others incurable; ſome are made with ſharp inſtruments, others with blunt ones; with regard to their figure, ſome form a right line, others are curved, tranſverſe, or oblique; with reſpect to their ſituation, ſome are placed in the head, others in the neck, thorax, or abdomen; and of theſe ſome are internal, others external; variety of different wounds ariſe from the great diverſity of condition that wounds are left in, for in ſome wounds, the inflicting inſtrument, or part of it, remains; for inſtance, a leaden bullet, a piece of glaſs, or of a granade; the points of ſwords or arrows: but in ſome wounds, nothing of this kind is left: ſometimes fractures of the bones accompany wounds, which is generally the caſe in gun-ſhot wounds: ſome wounds are alſo attended with poiſon, as thoſe which are made with poiſoned arrows; under this head may be ranked the bites of animals, but more particularly of mad or venomous animals. Some are of opinion, that wounds which are made with copper, or ſilver inſtruments, ſhould be reckoned in this claſs, the poiſon of which, if there is any, is owing to the vitriol that is mixed with theſe metals. See the articles PUNCTURE, STAB, BLOW, NECK, THORAX, ABDOMEN, *Gun-ſhot-wounds*, POISON, &c.

In ſlight wounds, where no conſiderable artery, nerve, or tendon is concerned, the following appearances are uſually remarkable; at firſt ſight the wound appears as a red line drawn upon the part: but upon being dilated, the blood inſtantly guſhes out in greater or ſmaller quantities, according to the ſize and number of the blood veſſels that are injured. The hæmorrhage, after a ſhort continuance, ſtops of its own accord, and the blood concreting in the wound, forms a cruſt; the lips of the wound now begin to look red, and ſwell, and are attended with ſome degree of pain and inflammation; if it is a large wound, a fever, that is to ſay, an univerſal heat and quickneſs of pulſe, almoſt always enſue upon the third or fourth day; ſooner or later, a whitiſh glutinous humour, not unlike white oil, appears, and this is known by the name of pus, or matter; upon the appearance of matter, the redneſs, tumour, pain, inflammation, and fever, diſappear entirely, or at leaſt are abated; and theſe are the ſigns of a wound inclining to heal; for under the matter new fleſh ſprings up from the wounded veſſels, which having by degrees filled the wound, dries upon its upper part, and forms a cicatrix. See the articles VEIN, ARTERY, NERVE, TENDON, HÆMORRHAGE, PUS, TUMOUR, INFLAMMATION, and CICATRIX.

In dangerous wounds, that is, where any conſiderable blood-veſſel is wounded or divided, there generally enſues ſo violent a hæmorrhage, that the wounded perſon is in an inſtant ſenſible of great loſs of ſpirits, and weakneſs, and faints away; and when the larger arteries are wounded, whether they are internal or external, he dies upon the ſpot; although ſomewhat leſs danger is apprehended from wounds that are inflicted upon the veſſels which are ſituated upon the external parts of the body (ſome few excepted) becauſe they will admit of the ligature, and other means of reſtraining the violence of the hæmorrhage.

There is nothing will give a truer light into the nature and conſequence of a deep wound, than a due conſideration of what natural actions of the body are impeded thereby. For inſtance, in wounds of the breaſt, when the patient draws his breath with ſhortneſs and difficulty, and is at the ſame time attended with an hæmoptyſis and hiccoughs, it may be rationally conjectured that the lungs, or the diaphragm are wounded; ſo in wounds of the abdomen, when chyle is voided, it is a plain indication that the ſtomach, ſmall guts, or lacteals, are wounded: when excrements paſs by the wound, the great guts are wounded. In the ſame manner, bilious blood ſhews the liver or gall-bladder to be divided: if urine paſſes by the wound, the urinary bladder, or elſe the ureters, are wounded; and bloody urine denotes a blow on the kidneys, or a wound of the bladder; but when there are large profuſions of blood this way, it is a ſign that ſome of the larger blood-veſſels are wounded: vomiting of blood, declares the ſtomach to be the injured organ: violent pains, attended with convulſive twitches, ſhew that a nerve is wounded, or elſe that ſome foreign ſubſtance is left in the wound. Whenever the ſenſes are diſordered after a wound received on the head, a concuſſion of the brain is much to be feared. Difficulty of breathing, pains in the breaſt, and hiccoughing, are ſymptoms of a wound in the diaphragm. It is of bad conſequence for a wound, to be attended with a large tumour; but it is of the laſt conſequence if it is attended with no degree of tumour at all; the firſt is an indication of great inflammation, the laſt of mortification; ſome degree of tumour is always therefore beſt in wounds.

In order to inquire what wounds admit of a cure, and what are incurable, Heiſter divides wounds into three ſorts. 1. Some wounds are abſolutely of themſelves mortal. 2. Others are in their own nature mortal, if not relieved by timely aſſiſtance. And, 3. Others become mortal by accident or imprudent treatment, though they were otherwiſe cureable.

1. We properly ſtyle thoſe wounds mortal which are not to be remedied by all the art and induſtry of man. Thus, wounds are of this kind which are attended with ſo violent an hæmorrhage, as to produce inſtant death: of this ſort are reckoned wounds that penetrate the cavities of the heart, and all thoſe wounds of the viſcera, where the large blood-veſſels are opened; ſuch are large wounds of the lungs, liver, ſpleen, kidneys, ſtomach, inteſtines, meſentery, pancreas, uterus; of the aorta, of the iliac, cœliac, renal, meſenteric, and carotid arteries; eſpecially if they

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are wounded near their origin; of the ſubclavian alſo, or vertebral; of the vena cava, the iliac vein, the internal jugular, vertebral, renal, meſenteric; of the vena porta, and of the larger veins that lie deep in the body, becauſe their ſituation will not admit of proper applications to reſtrain the flux of blood. Heiſter therefore reckons, very juſtly, theſe among the wounds that are abſolutely incurable, ſince they are not remediable either by aſtringents, ligature, or fire.

Thoſe wounds alſo are not leſs mortal than the former, which obſtruct, or entirely cut off the paſſage of the animal ſpirits to the heart; ſuch are wounds of the cerebellum, of the medulla oblongata, and ſome violent ſtrokes of the brain itſelf. There is reaſon to apprehend very great danger, when the ſmall veins or arteries, which are contained in the cranium, are injured; for the blood flowing from them into the internal ſinuſes of the brain, either produces too great a preſſure upon thoſe very tender parts of the brain, and ſo obſtructs the courſe of the blood and ſpirits; or elſe, being corrupted, it putrifies the brain itſelf, if it cannot be evacuated by the aſſiſtance of the trepan; which is the caſe when this accident happens at the lower part of the cranium, or in the ſinuſes of the brain; nor is there leſs danger where the nerves, which tend to the heart, are wounded, or entirely divided; for, after this, it is impoſſible for the heart to continue its motion. See the articles TREPAN, HEART, *&c.*

To this claſs are to be referred alſo all wounds which entirely deprive the animal of the faculty of breathing: there is therefore great danger where the aſpera arteria is intirely divided; for where it is only divided in part, it may be healed again by the aſſiſtance of an expert ſurgeon: to this place alſo belong violent ſhocks of the bronchia, mediaſtinum, and diaphragm, eſpecially the tendinous part of it. See ASPERA ARTERIA, *&c.*

Thoſe wounds alſo which interrupt the courſe of the chyle to the heart, are no leſs incurable than the former; ſuch are wounds of the ſtomach, inteſtines, receptacle of the chyle, thoracic duct, and larger lacteals; to which may be alſo added wounds of the œſophagus, if they are large; though death is not ſo ſudden an attendant on theſe wounds; but, for want of nouriſhment, the perſons afflicted by them are weakened by degrees, and at length die conſumptive. See the articles STOMACH, INTESTINE, *&c.*

In this account thoſe wounds alſo are not to be omitted, which are inflicted upon membranous parts, that are ſituated in the abdomen, and contain ſome ſecreted fluid, as on the bladder, either of the bile or urine, the ſtomach, inteſtines, receptacle of the chyle, and lacteal veſſels. The fluids contained in theſe parts, when once they are let looſe into the cavity of the abdomen, cannot be properly diſcharged, and therefore eaſily corrode the internal parts of the body; and the membranes that contained them are generally ſo fine, that they will not admit of agglutination, eſpecially ſince no medicine from without can be applied. A few indeed have recovered after ſlight wounds in theſe parts; but ſince the number of theſe inſtances is but few, and the cure in them has been accidental, and not performed by the ſurgeon's art, theſe may very juſtly be added to the liſt of mortal wounds. See ABDOMEN, *&c.*

2. Many wounds there are which though the experienced ſurgeon could remedy, yet prove fatal, if neglected, or left to nature: of this number are thoſe which produce inſtant death, unleſs relieved by preſent aſſiſtance; ſuch are wounds of the larger external blood-veſſels, which might be remedied by ligature, by the application of aſtringent medicines, or the actual cautery. Of this kind are wounds of the brachial, or crural artery, unleſs they are too near the trunk of the body; wounds in the large arteries of the cubit, or tibia; of the branches of the external carotid, or temporal artery; to theſe alſo may be added wounds of the jugular and other veins, ſituated upon the external parts of the body; but in theſe caſes no help can be given, unleſs the ſurgeon be brought before there has been a vaſt profuſion of blood. See the article CRURAL ARTERY, *&c.*

3. Wounds are properly ſaid to become mortal by accident, where the patient's death, from them, is occaſioned either by the ill conduct of the patient himſelf, or by the neglect or ignorance of his ſurgeon; the wound itſelf being of the number of thoſe deemed curable by the judicious practiſer. Under this head are to be reckoned, 1. Thoſe wounds which the ſurgeon has neglected to cleanſe ſufficiently, though he had it in his power

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to do it; as when ſome foreign body, which might eaſily have been extracted, is left in the wound, and produces inflammations, hæmorrhages, convulſions, and finally death itſelf; ſo in wounds of the thorax and abdomen, if the ſurgeon does not uſe his utmoſt diligence to evacuate the grumous blood, it will corrupt there, and by drawing the neighbouring parts into conſent, will expoſe the patient to death: great care muſt alſo be taken that the lips of the wound do not cloſe till the blood that is collected in the cavity of the body be all evacuated if poſſible, which will be eaſily perceived by the difficulty of breathing, and other bad ſymptoms going off; but if any of the larger internal veſſels are wounded, then all attempts to diſcharge the blood are vain, for the violence of the hæmorrhage takes off the patient. 2. Wounds are alſo to be accounted mortal by accident, which are treated or ſearched in too rough a manner by the ſurgeon; for if wounds are handled roughly, which are full of nervous parts, or of large blood-veſſels, there is great danger of bringing on hæmorrhages, convulſions, inflammations, gangrenes, and finally death itſelf. The caſe is alſo the ſame, 3. in external wounds, which are ſlight of themſelves, but under which the patient is loſt by the inflammation, which is increaſed and brought on by the ſurgeon's injudicious treatment; or, 4. when any one is taken off by the violence of the hæmorrhage from a wound of the hand or foot; for in this caſe, the ſurgeon might eaſily have ſtopped the blood by the application of proper remedies, or by ligature; or, 5. when the patient is guilty of any intemperance in eating or drinking, or of any exceſs of paſſion, of expoſing himſelf to the cold air, or of uſing violent exerciſe. For by theſe means, wounds, more eſpecially thoſe of the head, by being liable to freſh hæmorrhages, and other dangerous accidents, frequently become mortal, notwithſtanding they naturally would not prove ſo, and though the ſurgeon uſes his utmoſt care and ſkill. 6. Among theſe alſo are to be accounted thoſe wounds of the head, where the patient is loſt by the vaſt quantity of blood, which is extravaſated in the cavity of the cranium, and confined there; but where he might have been relieved if the trepan had been applied in time; for though wounds of this kind generally prove incurable, yet, as there is at leaſt a poſſibility of ſaving a perſon in theſe circumſtances, by the uſe of the trepan, this may properly be reckoned among the doubtful caſes, and not deemed abſolutely mortal. 7. And laſtly, a bad habit of body prevents the cure of wounds, which would admit of an eaſy cure in healthy ſubjects; ſo we often ſee the ſlighteſt puncture in the hand or foot of an hydropical, conſumptive, or ſcorbutic perſon, ſhall produce a gangrene, and prove mortal; though the ſurgeon ſpares no care nor application to prevent it. See GANGRENE, EXTRAVASATION, DROPSY, SCURVY, *&c.*

Cure of WOUNDS. Since a wound is a ſolution of the continuity of the parts of the body, the reunion of thoſe parts ſeems to be the principal intention; but ſince wounds are of very different kinds, ſome ſlight, and others of great conſequence, in proportion to this difference, ſo will the manner of proſecuting this intention differ.

The cure of ſlight wounds is generally performed with great eaſe, by applying a ſmall portion of lint to the part, well ſaturated with ſpirit of wine, oil of eggs, turpentine, baſilicon, the balſam of Arcæus, of Peru, *&c.* ſecuring the dreſſings with a plaſter, and renewing them once in a day or two: by this means, the lips of the wound will preſently agglutinate.

Wounds which are attended with ſome danger, are to be treated as follows: in the firſt place, the wound is to be cleanſed from all extravaſated blood, ſordes, *&c.* in the next place, if a bullet, the point of a ſword, any part of the clothing, a piece of glaſs, or any other foreign body, ſhall remain in the wound, it is to be removed with the fingers, or with proper inſtruments, as has been already explained under the articles EXTRACTION, and GUN-SHOT WOUNDS. The hæmorrhage is to be ſtopped at the firſt dreſſing; the divided parts are to be brought as near each other as poſſible, and their ſituation is to be ſo maintained, that the cicatrix which is left may appear even. See HÆMORRHAGE, BANDAGE, and CICATRIX.

Among the number of the moſt ſimple wounds are reckoned thoſe which are made by puncture, or ſtabbing upon the external parts, and not penetrating deep, the

the method of treating which has been given under the article PUNCTURE.

The method of treating a cut, or ſuch a wound as is made by a cutting inſtrument, where no part of the fleſh is taken off, and the accident happens to the external parts of the body, and does not penetrate deep, after the wound is cleanſed, it ſhould be dreſſed with the ſame vulnerary balſam, and the lips of the wound ſhould be cloſed, and kept in that ſituation. This is done after different methods, according to the difference of the wound. 1. It is to be done by placing the wounded part in a proper poſture, that is, as ſoon as the wound is dreſſed, the part ſhould be placed in ſuch a ſituation, that the divided parts may be moſt likely to keep in conſtant contact. 2. By a proper bandage, tying up the parts ſo that the lips may meet, and thereby eaſily unite. 3. By a proper ſuture, which differs according to the difference of the wound, but may be generally divided into the dry and bloody ſuture; the dry, or as ſome call it, the baſtard ſuture, is the application of ſticking plaſters, to keep the lips of the wound united; the bloody, or true ſuture, is performing the ſame thing with a needle and thread; the nature and method of each of which has been already treated of under the article SUTURE.

If the wound heals by the aſſiſtance of the ſuture, the threads or ligatures are to be cut near the knots; the lower lip of the wound is to be ſuſpended with one hand, while the threads are gently drawn out by the other; the punctures that are left will eaſily heal by the application of a vulnerary water, called by the french *l'eau d' arquebuſade*, or by injecting aqua calcis, or ſpirit of wine, and laying on compreſſes, dipped in the ſame liquors; but larger wounds are to be dreſſed with the balſam of arcæus, or balſam of capivi, *&c.* and the lips kept firm together, with ſome ſticking plaſter, till a firm cicatrix is formed.

Where there is a loſs of ſubſtance, the wound will not unite either by the help of plaſter, or ſuture, till it is filled up with new fleſh. For this purpoſe, you will find lint dipped in oil, or ſpread with ſome vulnerary balſam, or ointment, and applied to the bottom of the wound, very ſerviceable, covering it with a plaſter, compreſs and proper bandages, and this dreſſing is to be repeated daily. As hot or cold air is very hurtful to wounds, ſo it muſt by all means be kept from them, for which reaſon the ſurgeon ſhould be careful not to remove the old dreſſings till the freſh ones are got ready, and to be as expeditious as poſſible in applying them. After this, when a white, even, thick matter appears in the wound, it ſhould be dreſſed as you ſee occaſion, every day, or every other day; the ſuperfluous matter ſhould be wiped away with a very light hand; and it is better to leave ſome behind, than to treat the wound roughly; theſe rules being obſerved, the fleſh will ſpring up preſently, and the wound unite; and in order to perfect the cure of the wound, an even cicatrix ſhould, if poſſible, be procured, for the method of obtaining which, ſee the article PUS, *&c.*

When any uncleanneſs or foulneſs is perceived in a wound, that is, if the fleſh is putrid, fungous, black or livid, it muſt be well cleanſed before any attempt is made to heal it, for which purpoſe apply a digeſtive ointment, made with turpentine, yolk of eggs, and honey of roſes; and where this is not ſtrong enough, ſubſtitute the egyptian ointment, or ſpirit of wine diluted; or if you require more ſtrength, uſe red precipitate mercury. Applications of this kind are to be continued till the wound is intirely clean; after which, recourſe is to be had to the methods already preſcribed. If the new fleſh ſhould be luxuriant, and riſe up ſo as to prevent the formation of an even cicatrix, it muſt be taken down with green vitriol, or a powder compoſed of burnt alum, and red precipitate mercury; at the ſame time making a proper preſſure, with the plaſters, compreſſes, and bandages, till the parts are even. See the article FUNGUS.

The patient ſhould obſerve a ſtrict regimen with regard to his diet and manner of life, as nothing forwards the cure ſo much as a good habit of body, which may be procured by obſerving a ſtrict regularity with regard to diet, air, keeping the paſſions under, and indulging neither too much ſleep, nor ſuffering too great watchfulneſs; and it is to be obſerved, that the greater tendency there is in a patient to a diſeaſed ſtate of body, ſo much the ſtricter courſe of life ought he to obſerve. See the articles DIET, REGIMEN, AIR, SLEEP, WATCHFULNESS, PASSIONS and DISEASE.

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The bowels ſhould by all means be kept open, eſpecially in thoſe who have received a wound in the head; however, it is to be obſerved, that ſtrong cathartic medicines are to be avoided; but it is not only ſafe but adviſeable to eat and drink thoſe things that may at the ſame time nouriſh and keep the body open. To this end the patient may drink plentifully of tea or coffee, may eat ſtewed prunes, roaſted apples: but hard meats of all kinds are forbid: where the patient is ſo bound up, that a diet of this kind has no effect, it will be neceſſary to have recourſe to medicines, but then thoſe muſt be of the mildeſt kind; here a gentle clyſter may be given, a ſuppoſitory may be uſed, or an ounce or two of manna, or ſome purging ſalts in warm broth may be preſcribed: whenever the violence of the wound, or the ill habit of the patient require the uſe of internal remedies, vulnerary drinks will be found to be of the greateſt conſequence, in compoſing which, the conſtitution of the patient, and the nature of the complaint ſhould be diligently conſulted; for if the patient is of a phlegmatic habit of body, cold, pale, or naturally ſubject to tumours, then the vulnerary decoction ſhould be compoſed of herbs that attenuate and divide the blood. See ATTENUANTS.

If the patient has a thin ſharp blood, then decoctions of viſcous and glutinous plants will be proper; but if he is vexed with great pain or wakefulneſs, then ſome opiates muſt be adminiſtred. If he ſhould be troubled with an acidity, abſorbents are proper; and when a quickneſs of pulſe, and an extraordinary heat are perceived, they are ſure ſigns of a ſymptomatical fever. See AGGLUTINANTS, OPIATES, ABSORBENTS, and FEVER.

For the diſorders accompanying wounds, commonly called the ſymptoms of wounds, as hæmorrhages, pains, ſpaſms, convulſions, &c. See HÆMORRHAGE, &c.

For wounds in the neck, and wounds in the eyes. See NECK and EYE.

For wounds in the abdomen, inteſtines, &c. ſee ABDOMEN, GASTRORAPHY, INTESTINES, &c.

For wounds of the thorax, ſee the article THORAX.

For wounds of the head, ſee the articles SKULL, FISSURE, CONTRA-FISSURE, EXTRAVASATION, CONTUSION, FRACTURE, TREPAN, &c.

For gun-ſhot wounds, &c. ſee the article GUN-SHOT *wounds*, &c.

For the treatment of ſuch wounds as the patient undergoes in the ſeverer operations of ſurgery, ſuch as lithotomy, trepanning, amputation of a limb, or large tumour, extirpation of the breaſt, the cæſarean ſection, &c. See LITHOTOMY, TREPANNING, &c.

WOUNDS *in horſes*. The moſt terrible wounds theſe creatures are ſubject to, are thoſe got in the field of battle. The farriers that attend camps, have a coarſe way of curing theſe; but it is a very expeditious and effectual one. If the bullet be within reach, they take it out with a pair of forceps; but if it lie too deep to be come at, they leave it behind, and dreſs up the wound in the ſame manner as if it were not there. They firſt drop in ſome varniſh from the end of a feather, and when the bottom is thus wetted with it, they dip a pledget of tow in the ſame varniſh, which they put into the wound, and then cover the whole with the following charge: take a quarter of a pound of powder of bole armenic, half a pound of linſeed-oil, and three eggs, ſhells and all; add to theſe four ounces of bean-flour, a quart of vinegar, and five ounces of turpentine; this is all to be mixed over the fire, and the wound covered with it. This application is to be continued four or five days; then the tent put into the wound is to be dipped in a mixture of turpentine and hogs-lard; by this means a laudable matter will be diſcharged, inſtead of the thin ſharp water that was at firſt. Then the cure is to be compleated by dreſſing it with an ointment made of turpentine, firſt well waſhed, and then diſſolved in yolks of eggs, and a little ſaffron added to it.

This is the practice in deep wounds that do not go through the part; but in caſes where the bullet has gone quite through, they take a few weaver's linnen-thrumbs, made very knotty; theſe they make up into a kind of link, and dipping it in varniſh, they draw it through the wound, leaving the ends hanging out at each ſide; by means of theſe they move the link or ſkain three or four times a day, always wetting the new part that is to be drawn into the wound with freſh varniſh. They put on a charge of the bole armenic, &c. as before deſcribed, on each ſide of the wounded part, and continue this as long as the wound diſcharges thin watery

watery matter, or the ſides continue ſwelled. After this they dreſs it with the ointment of turpentine, yolks of eggs, and ſaffron, till it is perfectly cured.

The other methods are the dreſſing the wound with an ointment made of wax, turpentine, and lard, and covering it with linnen-rags wetted with cream; or the dreſſing, with a mixture of yolks of egg, honey, and ſaffron, and covering it up with cream and baum-leaves beaten together.

When the wound is ſo dangerous as to require the aſſiſtance of internal medicines, they give the following pills: take aſſa fœtida, bay-berries, and native cinnabar, of each a pound; beat up the whole into a maſs with brandy, and roll it into pills of fourteen drams weight each. Theſe are to be laid in a ſhady place to dry, after which they will keep ever ſo long without any damage. The horſe is to take two of theſe every other day, or, if neceſſary, every day, till he has taken eight or ten of them; and he is to ſtand bridled two hours before and after the taking of them.

When the wound ſeems at a ſtand, not appearing foul, and yet not gathering new fleſh, there muſt be recourſe had to the following powder, whoſe effect in bringing new fleſh is wonderful: take dragon's blood and bole-armenic, of each two ounces; maſtic, olibanum, and ſarcocolla, of each three drams; aloes, round birth-wort, and common iris-root, of each one dram and a half; make the whole into a fine powder. This is ſometimes uſed dry, ſprinkling it on the wound; but ſometimes it is mixed with turpentine, ſometimes with juice of wormwood, and ſometimes with honey of roſes, and either way does very well.

When the wound grows foul, and requires a detergent to cleanſe it, the common liquor for this purpoſe is a phagedenic water, which they make of lime-water and ſublimate, in this manner: take two pounds and a half of newly made and unſlacked lime, put it into a pewter-veſſel, and pour on it five quarts of boiling water: when the bubbling is over, let it ſtand to reſt two or three days, ſtirring it often with a ſtick, then pour it clear off, after a due time, for the lime to ſettle; and filtre it through ſome whited brown paper, made for the lining of funnels on this occaſion. To a quart of the clear lime-water thus prepared, add eight ounces of ſpirit of wine, and one ounce of ſpirit of vitriol; when theſe are well mixed by ſhaking them together, then add an ounce of corroſive ſublimate in fine powder: mix all well together, and keep the whole in a bottle to be uſed for the cleanſing of theſe foul wounds, and on any other occaſion where there may be a detergent of this powerful kind neceſſary. It will keep good many years. If this water will not thoroughly cleanſe the wound, but there ſtill will remain a quantity of foul matter in it, and there is danger of a gangrene, they add to it as much arſenic, in fine powder, as there was of the corroſive ſublimate; that is, at the rate of an ounce to a quart and half a pint.

WRACK, or WRECK. See WRECK.

WREATH, in heraldry, a roll of fine linnen or ſilk (like that of a turkiſh turbant) conſiſting of the colours borne in the eſcutcheon, placed in an atchievement between the helmet and the creſt, and immediately ſupporting the creſt. See the article CREST, *&c.*

WRECK, called alſo *ſhip*-WRECK, or *ſhip*-WRACK, in law, is when a ſhip periſhes on the ſea, and no perſon eſcapes alive out of it.

In this caſe, if the ſhip ſo periſhed, or any part thereof, or the goods of the ſhip come to the land of any lord, and are left there, the lord ſhall have the ſame, as being a wreck of the ſea: but if any ſingle perſon, or even a dog, or other living creature, eſcape alive out of the ſhip, the party to whom the goods belong, may come within a year and a day, and proving the goods to be his, he ſhall have them again. And it is held that they are no wrecks, ſo long as they remain at ſea, within the juriſdiction of the admiralty. The year and day that ſhall ſubject the goods to be forfeited, muſt be computed from the time of ſeizure; in which time, if the owner of the goods die, his executors or adminiſtrators may make proof; but when the goods are bona peritura, the ſheriff may ſell them within the year, provided he diſpoſes of the ſame to the beſt advantage, and accounts for them. In caſe any goods ſhipwrecked are ſeized by any perſon having no authority to do it, the owner may bring an action againſt him for ſo doing. It is enacted by 12 Ann. c. 18. that if any wreck happen by any fault or negligence of maſter or mariners, the maſter muſt make good the loſs; but if the ſame was occaſioned by tem-

peſt, enemies, &c. he ſhall be excuſed: making holes in ſhips, or doing any thing wilfully tending to the loſs thereof, is by that ſtatute declared felony; and by this act juſtices of the peace are required to command aſſiſtance for preſerving ſhips in danger of wreck on the coaſts; and officers of men of war, and other ſhips, are to be aiding and aſſiſting in the preſerving ſuch veſſels, under the penalty of 100l. And, further, no perſon ſhall enter ſuch veſſel without leave of her commander, or a conſtable, &c. and perſons carrying away goods from ſuch ſhips, ſhall pay treble value; but the perſons giving aſſiſtance, ſhall be paid by the maſter a reaſonable reward for ſalvage, &c.

WRECK, in metallurgy, a veſſel in which the third waſhing is given to the ores of metals.

WREN, in ornithology, the cheſnut-coloured motacilla, with the wings variegated with white and grey. See the article MOTACILLA.

This is a very minute bird; we have not any in Europe that is ſmaller: the head is large and round, the eyes dark, and the beak ſlender and brown; the tail is ſhort, and generally carried erect; the head, neck, and back are of a duſky cheſnut-brown; the throat is of a paliſh white colour, the middle of the breaſt is ſtill whiter, and the lower part of it is variegated with obſcure and tranſverſe lines of black. See plate CCXCVI. fig. 4.

WRESTLING, a kind of combat or engagement between two perſons unarmed, body to body, to prove their ſtrength and dexterity, and try which can throw his opponent to the ground. See the articles EXERCISE, GAMES, &c.

Wreſtling, *palæſtra*, is an exerciſe of very great antiquity and fame. It was in uſe in the heroic age; witneſs Hercules, who wreſtled with Antæus. See the articles PALÆSTRA and GYMNASTICS.

It continued a long time in the higheſt repute, and had conſiderable rewards and honours aſſigned it at the olympic games. It was the cuſtom for the athletæ to anoint their bodies with oil, to give the leſs hold to their antagoniſt. See ATHLETÆ, &c. Lycurgus ordered the ſpartan maids to wreſtle in public, quite naked, in order, as it is obſerved, to break them of their too much delicacy and niceneſs, to make them appear more robuſt, and to familiarize the people, &c. to ſuch nudities.

WREXHAM, a market-town of Denbighſhire, in Wales, ſituated twenty-three miles ſouth-eaſt of St. Aſaph.

WRINTON, a market-town of Somerſetſhire, ſituated ſeven miles north of Wells.

WRIST, *carpus*, in anatomy, a part of the hand conſiſting of eight ſmall, unequal, and irregular bones, all which taken together, repreſent a ſort of grotto of an irregular quadrangular figure, and connected principally with the baſis of the radius. Conſidered in this manner, the whole connection of them has two ſides and four edges; one of the ſides is convex and external, the other concave and internal. The convexity of the outſide is pretty regular and even; but the concavity of the inſide has four eminences, one at each corner. One of the four edges touches the fore-arm, and is as it were the head of the carpus; another of the edges touches the metacarpus, and may be called the baſis; the third is toward the point of the radius, and the fourth toward the point of the ulna; the firſt of theſe latter two may be called the ſmall edge, the latter the larger. See HAND.

The bones of the carpus are divided into two rows, the firſt of which lies next the fore-arm, the ſecond next the metacarpus; each row conſiſts of four bones; but the fourth of the firſt row lies in a manner out of its rank. Each bone has ſeveral cartilaginous ſurfaces for their mutual articulations, and, in ſome of them, for their articulations with the radius, and bones of the metacarpus and thumb. It is to no purpoſe to diſtinguiſh the three ordinary dimenſions in any of theſe bones, except one; but in moſt of them we may conſider ſix ſides, one external, turned towards the convex ſurface of the carpus; one internal, toward the concave ſurface; one toward the fore-arm, which may properly be called the brachial ſide; one toward the fingers, to be called the digital ſide; one toward the point of the radius, or the radial ſide, and one toward the point of the ulna, or the cubical ſide. The articulation of the bones of the carpus is triple: 1. with one another: 2. with the bones of the metacarpus, and, 3. with the cubitus.

The muſcles of the carpus are ſix, three of which are flexors, and three extenſors. The three flexors all ariſe from the internal condyle of the humerus; they are the radiæus internus, the ulnaris internus,

nus, and the palmaris. See the articles MUSCLE, FLEXOR, RADIÆUS, *&c.*

The three extenſors all ariſe from the external condyle of the humerus; they are, 1. the radiæus externus: 2. the longus and brevis, called by others bicornus, and, 3. the ulnaris externus. See the article EXTENSOR, *&c.*

WRIST LUXATED. See *Luxation of the* HAND.

WRIST FRACTURED. The bones of the wriſt are very ſeldom ſubject to fracture, on account of their ſmallneſs. And when they are fractured, there is but little hopes of a cure; for the ligaments and tendons are here ſo numerous, and the bones ſo very ſmall, that it is ſcarce poſſible to reduce them to their places, or to make them grow together again.

On this account the joint of the hand generally becomes ſtiff and immoveable after theſe accidents, or elſe abſceſſes, ſuppurations, fiſtulæ, and caries of the bones follow them; and theſe, on account of the ſoftneſs of the bones, and the difficulty of diſcharging the matter, are ſeldom remedied, but by amputating the hand.

What can be done, however, toward the curing a fracture in this part, is this; the aſſiſtant muſt lay hold of the hand above the wriſt and below it, and extend them as far as is neceſſary in oppoſite directions; the ſurgeon is, while this is doing, to replace the bones with his fingers, and when they are all replaced, to bind the hand up with a proper bandage.

WRIST, in the manege. The bridle-wriſt, is that of the cavalier's left hand. A horſeman's wriſt and his elbow ſhould be equally raiſed, and the wriſt ſhould be two or three fingers above the pummel of the ſaddle. To ride a horſe from hand to hand, *i. e.* to change hands upon one tread, you need only to turn your wriſt to that ſide you would have the horſe to turn to, without advancing your hand. But if your horſe ſtops, you muſt make uſe of both your legs. See the articles HAND and LEG.

WRIT, in law, ſignifies, in general, the king's precept in writing under ſeal, iſſuing out of ſome court, directed to the ſheriff, or other officer, and commanding ſomething to be done in relation to a ſuit or action, or giving commiſſion to have the ſame done. And, according to Fitzherbert, a writ is ſaid to be a formal letter of the king in parchment, ſealed with his ſeal, and directed to ſome judge, officer, or miniſter, *&c.* at the ſuit of a ſubject, for the cauſe briefly expreſſed, which is to be determined in the proper court according to law. See the articles BREVE, PRECEPT, *&c.*

Writs, in civil actions, are either original or judicial: original, are ſuch as are iſſued out of the court of chancery, for the ſummoning of a defendant to appear, and are granted before the ſuit is commenced, in order to begin the ſame; and judicial writs iſſue out of the court where the original is returned, after the ſuit is begun. The originals bear date in the king's name; but judicials bear teſte in the name of the chief juſtice or chief baron: and a writ without a teſte is not held to be good, for the time may be material when it was taken out, and the ſame is proved thereby; alſo in caſe it iſſue out of the common law courts, the writ muſt be dated ſome day in term; but in chancery, writs may be iſſued in vacation, that court being always open: where a ſuit is by original, there muſt be fifteen days at leaſt between the teſte and return of all writs; yet by 13 Car. II. c. 2. delays in actions by reaſon of fifteen days between the teſte and return of writs in perſonal actions and ejectments, are remedied. See RETURN, TESTE, *&c.*

As in actions, ſo writs are likewiſe real, that concern the poſſeſſion of lands, called writs of entry, or of right which relate to the property, *&c.* and perſonal, relating to goods, chattels, and perſonal injuries: though the moſt common writs in uſe are in debt, detinue, treſpaſs, action upon the caſe, account and covenant, *&c.* See ACTION, DETINUE, and TRESPASS.

After an action is fixed for any wrong done, or a debt or right detained, there muſt be a writ taken out that is ſuitable to the action, and on which it is grounded; though in ſome caſes the writ may be general, and the declaration thereon ſpecial: likewiſe four defendants can be included in one writ, but there muſt be ſeveral warrants from the ſheriff to execute the ſame. See WARRANT.

All the uſual writs are to be returned and filed in due time, thereby to avoid poſt terminums; and it is filing that makes them the warranty for the proceedings. Writs cannot be denied to any one, but may be abated in ſeveral caſes. See ARRESTS, FILING, *&c.*

WRIT *of aſſiſtance*, is a warrant that iſſues out of the exchequer to authorize perſons to take a conſtable, or other public offi-

cer, to ſeiſe goods or merchandizes prohibited and uncuſtomed, &c. by virtue of which writ any perſon may, in the day-time, and in the preſence of ſuch conſtable, &c. break open doors, cheſts, warehouſes, and other places, to ſearch for and ſeiſe uncuſtomed goods. There is alſo a writ of this name that is uſed to give poſſeſſion of land; and likewiſe for the general aſſiſtance of ſheriffs, &c.

WRIT *of inquiry and damages*, a judicial writ that iſſues out to the ſheriff upon a judgment by default, in action of the caſe, covenant, treſpaſs, trover, &c. commanding him to ſummon a jury to enquire what damages the plaintiff hath ſuſtained, occaſione præmiſſorum; and when this is returned with the inquiſition, the rule for judgment is given upon it; and if nothing be ſaid to the contrary, judgment is thereupon entered.

WRIT *of rebellion*, is a writ iſſuing out of the court of chancery or exchequer, againſt a perſon who is in contempt for not appearing in one of theſe courts, &c. See COMMISSION *of rebellion*.

WRITER *of the tallies*, an officer of the exchequer, being clerk to the auditor of the receipt, who writes, upon the tallies, the whole letters of the teller's bill. See TALLY, EXCHEQUER, &c.

WRITING, *ſcriptura*, the art or act of ſignifying and conveying our ideas to others, by letters, or characters, viſible to the eye. See CHARACTER, LETTER, WORD, &c.

Writing is now chiefly practiſed among us by means of pen, ink, and paper; though the antients had other methods. See the articles PEN, INK, PAPER, and BOOK, BARK, STYLE, &c.

To write without blacking the fingers, Mr. Boyle directs us as follows. Prepare the paper with a fine powder made of three parts of calcined copperas, two of galls, and one of gum arabic; thoſe being freſh mixed, rub them with a hare's foot into the pores of the paper, and write with fair water, and the black letters will immediately appear.

To make new writing appear old, the ſame author directs to moiſten it well with oil of tartar per deliquium, more or leſs diluted with water, as you deſire the ink to appear more or leſs decayed.

We may write without ink or its materials. For this purpoſe take a fine powder of calcined hartſhorn, of clean tobacco-pipes, or rather of mutton-bones burnt to a perfect whiteneſs, and rub it upon the paper, and then write with a ſilver bodkin, or the like.

WRONG, in a logical ſenſe. See ERROR, FALSHOOD, TRUTH, &c.

WRONG, in a legal ſenſe, the ſame with injury, or tort. See the articles INJURY, JUSTICE, TORT, RIGHT, &c.

WROTHAM, a market town of Kent, ſituated ten miles weſt of Maidſtone.

WRY-NECK, *jynx*, in ornithology. See the article JYNX.

WRY NECKED. See the article NECK.

WURTEMBURG, or WIRTENBURG DUTCHY, in Germany, is the north part of the circle of Swabia, bounded by the palatinate of the Rhine and Franconia, on the north; by Oetingen and the biſhopric of Auſburg, on the eaſt; by the territories of Ulm and Furſtemburg, on the ſouth; and by the territories of Baden, on the weſt; being ſeventy miles long, and almoſt as much in breadth.

WURTZBURG, a city of Germany, in the circle of Franconia, capital of the biſhopric of that name, ſituated on the river Maine, in eaſt long. 9° 50′, north lat. 49° 46′.

WYCH-HOUSE, a houſe in which ſalt is boiled. See SALT.

WYDRAUGHT, a water-courſe, or water paſſage, to carry off the filth of a houſe, properly a ſink, or common ſhore. See SEWER and CLOACA.

WYE, a market town of Kent, ſituated twenty miles ſouth eaſt of Maidſtone.

WYE is alſo a river of Wales, which, riſing on the confines of Cardiganſhire, and running ſouth-eaſt, divides the counties of Radnor and Brecknock; then croſſing Herefordſhire it turns ſouth, and falls into the mouth of the Severn at Chepſtow.

WYKE, antiently ſignified a farm, hamlet, or little village. See FARM, HAMLET, and VILLAGE.

WYNENDALE, a town of the auſtrian Netherlands, in the province of Flanders, ſituated eleven miles ſouth-weſt of Bruges.

WYTE, or WITE, in our antient cuſtoms, a pecuniary penalty or mulct. The Saxons had two kinds of puniſhments, were and wyte; the firſt for the more grievous offences. See WERE.

The wyte was for the leſs heinous ones. It was not fixed to any certain ſum, but left at liberty to be varied according to the nature of the caſe. Hence alſo wyte, or wittree, one of the terms of privilege granted to our ſportſmen, ſignifying a freedom or immunity from fines or amerciaments.

X.

X, or x, is the twenty-ſecond letter of our alphabet, and a double conſonant. It was not uſed by the Hebrews or antient Greeks; for as it is a compound letter, the antients, who uſed great ſimplicity in their writings, made uſe of, and expreſſed, this letter by its component letters *c s*. Neither have the Italians this letter, but expreſs it by *ſſ*. X begins no word in our language, but ſuch as are of greek original, and is in few others, but what are of latin derivation, as *perplex*, *reflexion*, *defluxion*, *&c.* We often expreſs this ſound by ſingle letters, as *cks* in *backs*, *necks*; by *ks*, in *books*, *breaks*; by *cc*, in *acceſs*, *accident*; by *ct*, in *action*, *unction*, *&c.* The Engliſh and French pronounce it like *cs* or *ks*; the Spaniards like *c* before *a*, *viz. Alexandro*, as if it were *Alecandro*. In numerals it expreſſeth 10, whence in old roman manuſcripts it is uſed for *denarius*; and as ſuch ſeems to be made of two V's placed one over the other. When a daſh is added over it, thus $\overline{X}$, it ſignifies ten thouſand.

XACA, a port-town of Sicily in the province of Mazara, forty miles ſouth of Palermo: eaſt lon. 13°, north lat. 37°.

XALISCO, a city of Mexico, in America, ſituated near the Pacific ocean, four hundred miles weſt of the capital city of Mexico: weſt longit. 110°, and north lat. 22° 20′.

XANSI, a province of China, bounded by the province of Peking on the eaſt, by the great wall on the north; by the province of Honan on the ſouth, and by the river Crocei, which divides it from the province of Xenſi, on the weſt.

XANTHICA, in antiquity, a macedonian feſtival, ſo called becauſe it was obſerved in the month Xanthus, which, as Suidas tells us, was the ſame with April. At this time the army was purified by a ſolemn luſtration, in the following manner: they divided a bitch into two halves, one of which, together with the entrails, was placed upon the right hand, the other upon the left; between theſe the army marched in this order; after the arms of the macedonian kings came the firſt part of the army; theſe were followed by the king and his children, after whom went the life-guards, and the reſt of the army. This done, the army was divided into two parts, one of which being ſet in array againſt the other, there followed a ſhort encounter, in imitation of a fight.

XANTHIUM, the LESSER BUR-DOCK, in botany, a genus of the *monoecia-pentandria* claſs of plants, the compound flower of which is uniform, tubulous, equal, and diſpoſed in the form of a hemiſphere; the partial flower is monopetalous, tubulous, funnel-faſhioned, erect, and quinquifid; the fruit is a dry, ovato-oblong, bilocular berry, bifid at the apex, hairy, and covered over with hooked prickles; the ſeed is ſingle, oblong, convex on one ſide, and plane on the other.

XANTUM, a province of China, in Aſia, bounded by the Kang ſea on the north, by the gulph of Nankin on the eaſt, by the province of Nankin on the ſouth, and by the province of Peking on the weſt.

St. XAVIER, a town of the province of La Plata, or Guayra, in ſouth America, ſituated on the confines of Braſil, two hundred miles weſt of Rio Janeiro: weſt long. 50°, ſouth lat. 24°.

XENODOCHUS, an eccleſiaſtical officer in the greek church, the ſame with hoſpitaller; or a perſon who takes care of the reception and entertainment of ſtrangers.

XENSI, a province of China, bounded by the great wall on the north, by the province of Xanſi on the eaſt, by the province of Suchuen on the ſouth, and by Tibet on the weſt.

XERANTHEMUM, or XERANTHEMOIDES, the AUSTRIAN SNEEZEWORT, in botany, a genus of the *ſyngeneſia-polygamia-ſuperfluua* claſs of plants; the compound flower of which is unequal, and conſiſts of many tubulous hermaphrodite floſcules placed on the diſc, and alſo a few female tubulated ones on the verge; the ſeeds are oblong, coronated, and contained in the cup.

XEREZ DE LA FRONTIERA, a town of Spain, in the province of Andaluſia, twenty miles north of Cadiz.

XEREZ DE GUADIANA, a town of Spain, in the province of Andaluſia, ſituated on the river Guadiana: weſt long. 8° 14′, north lat. 37° 15′.

XEROPHAGIA, in church-hiſtory, the eating of dried foods: ſo the antient chriſtians called certain faſt-days, on which they eat nothing but bread and ſalt, and drank only water: ſometimes they added pulſe, herbs, and fruits. This ſort of faſting was obſerved chiefly in the holy-week, out of devotion, and not by obligation.

XESTA, an attic meaſure of capacity. See the article MEASURE.

XIMENIA, in botany, a genus of plants, the characters of which are not perfectly aſcertained: the calyx is a perianthium, compoſed of three ſmall, cordated, and deciduous leaves; the corolla is formed of a ſingle petal, of a campanulated figure, divided at the edge into three erect, oblong, obtuſe ſegments; the germen is ſmall, and of a ſuboval figure; the fruit is an oval drupe, containing one cell; the ſeed is oval, unilocular, and ſmooth.

XICHU, a city of China, in the province of Huguam: eaſt lon. 112°, north lat. 27°.

XINYAN, or CHINIAN, a city of Aſia, in the province of Laotung: eaſt lon. 120°, north lat. 31°.

XIPHIAS, the SWORD-FISH, in ichthyology, a genus of the acanthopterigious claſs of fiſhes. The roſtrum, or extremity of the head of the xiphias, is continued forward, with an extremely long point, of a depreſſed, or ſomewhat flated figure, reſembling the blade of a ſword, and of a bony ſtructure; the lower jaw is acute, and of ſomewhat a triangular figure; the body is oblong, and of a rounded figure, and is conſiderably thick in proportion to its length; the back is convex, and the ſides are rounded; there are no belly-fins, and on the back there is only one fin, which is very long, and loweſt in the middle; the branchioſtege membrane, on each ſide, contains only eight bones. About fifteen feet in length is the ſize of a moderately large one, but not unfrequently is it met with much bigger. See plate CCCII. fig. 4.

XIPHIAS is alſo a fiery meteor, in form of a ſword. It differs from the acontias in this, that the latter is longer, and more like a dart; and the former ſhorter and broader in the middle.

XIPHIUM, in botany, a name given by ſome to a plant otherwiſe called iris. See the article IRIS.

XIPHOIDES, in anatomy, a cartilage adhering to the ſternum; called alſo cartilago enſiformis. See STERNUM.

XUCAR, a river of Spain, which riſes in New Caſtile, and, having run through that province, croſſes the province of Valencia, and falls into the Mediterranean, twenty miles ſouth of the city of Valencia.

XYLARIA, in botany, a genus of funguſſes, conſiſting of branches or ſtalks, of a woody ſtructure, tough, firm, and hard, and of an uneven ſurface. Theſe fungi produce ſeparate male and female flowers: the male flowers conſiſt only of antheræ of an oblong figure, ſupported on very ſhort ſtamina, and placed only on the upper parts of the plant. The female flowers are lodged in cavities, or cells, in the lower parts of the plant, and conſiſt of placentæ, of a roundiſh figure, and gelatinous ſubſtance, to which are affixed great numbers of roundiſh ſeeds.

XYLO-ALOES, or ALOE-WOOD, in pharmacy. See ALOE.

This drug is diſtinguiſhed into three ſorts, the calambac, the common lignum aloes, and calambour.

The calambac, or fineſt aloes-wood, called by authors lignum aloes præſtantiſſimum, and by the Chineſe ſukhiang, is the moſt reſinous of all the woods we are acquainted with: it is of a light ſpongy texture, very porous, and its pores ſo filled up with a ſoft and fragrant reſin, that the whole may be preſſed and dented by the fingers like wax, or moulded about by chewing in the mouth, in the manner of maſtich. This kind, laid on the fire, melts in great part like reſin, and burns away in a few moments, with a bright flame and perfumed ſmell. Its ſcent, while in the maſs, is very fragrant and agreeable; and its taſte acrid and bitteriſh, but very aromatic and agreeable: it is ſo variable in its colour, that ſome have divided it into three kinds, the one variegated with black and purple; the ſecond, with the ſame black, but with yellowiſh inſtead of purple; and the third, yellow alone, like the yolk of an egg: this laſt is the leaſt ſcented of the three; the ſubſtance, however, in them all, is the ſame in every reſpect, except their colour. It is brought from Cochinchina.

The lignum aloes vulgare is the ſecond in value. This is of a more denſe and compact texture, and conſequently leſs reſinous than the other: there is ſome of it, however, that is ſpongy, and has the

Fig. 1. ZEBRA

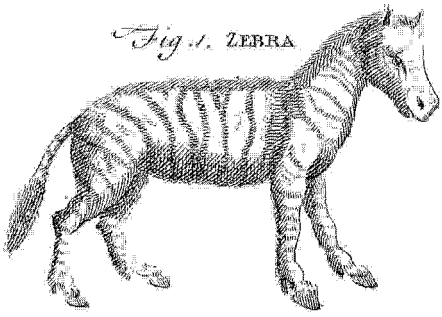


Fig. 3. XYRIS

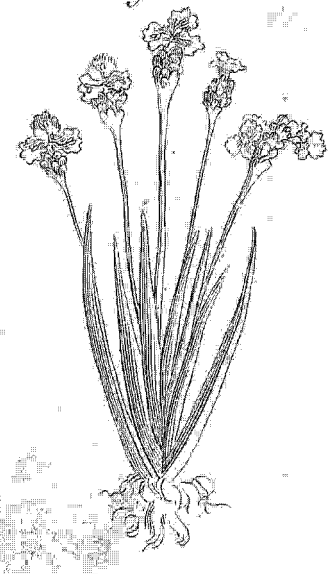


Fig. 2. ZIBETHICUS

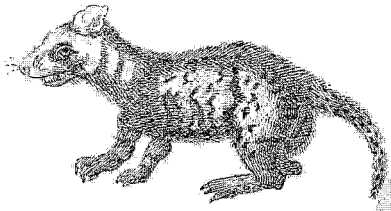


Fig. 6 XERANTHEMUM

Fig. 4. XIPHIAS

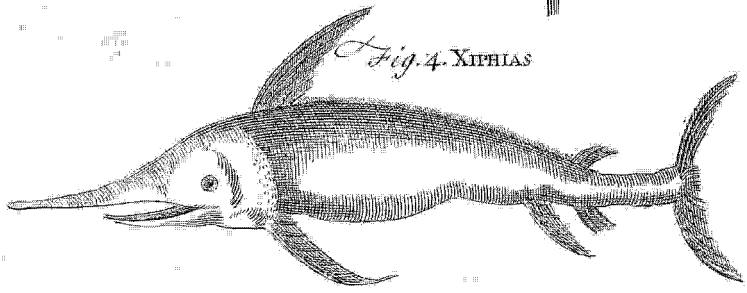
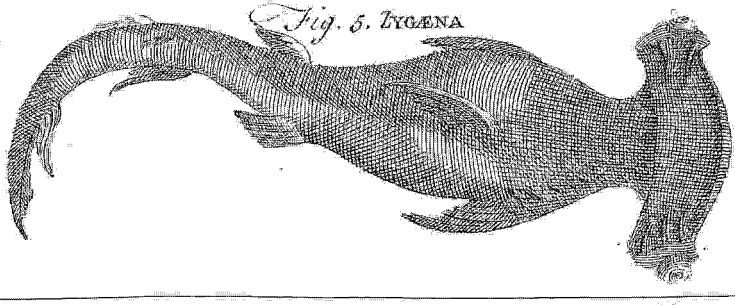


Fig. 5. ZYGÆNA



J. Jeffreys sculp.

the holes filled up with the right reſinous matter; and all of it, when good, has veins of the ſame reſin in it. We meet with it in ſmall fragments, which have been cut and ſplit from larger; theſe are of a tolerably denſe texture, in the more ſolid pieces, and of a duſky brown colour, variegated with reſinous black veins. It is in this ſtate very heavy, and leſs fragrant than in thoſe pieces which ſhew a multitude of little holes, filled up with the ſame blackiſh matter that forms the veins in others. The woody part of theſe laſt pieces is ſomewhat darker than the other, and is not unfrequently purpliſh, or even blackiſh. The ſmell of the common aloe-wood is very agreeable, but not ſo ſtrongly perfumed as the former. Its taſte is ſomewhat bitter and acrid, but very aromatic. This wood is alſo brought from Cochinchina, and ſometimes from Sumatra.

The calambour, or, as ſome write it, calambouc, is alſo called agallochum ſylveſtre, and lignum aloes mexicanum. It is a light and friable wood, of a duſky and often mottled colour, between a duſky green black, and a deep brown. Its ſmell is fragrant and agreeable, but much leſs ſweet than that of either of the others; and its taſte bitteriſh, but not ſo much acrid or aromatic as either of the two former. We meet with this very frequent, and in large logs, and theſe ſometimes entire, ſometimes only the heart of the tree, the cortical part being ſeparated. This is brought from the iſland of Timor, and is the aloe-wood uſed by the cabinet-makers and inlayers.

The Indians uſe the calambac by way of incenſe, burning ſmall pieces of it in the temples of their gods; and ſometimes their great people burn it in their houſes, in times of feaſting. It is eſteemed a cordial, taken inwardly; and they ſometimes give it in diſorders of the ſtomach and bowels, and to deſtroy worms. A very fragrant oil may be procured from it, by diſtillation, which is recommended in paralytic caſes, from five to fifteen drops. It is at preſent, however, but little uſed, and would ſcarce be met with any where in the ſhops, but that it is an ingredient in ſome of the old compoſitions.

XYLO-BALSAMUM, a name which naturaliſts give to the wood of the tree which yields that precious gum known to the Latins by the name of opobalſamum, and to us by the balm of gilead. See the article BALSAM.

We have branches of this tree brought us from Cairo; they are very ſtrait, brittle, unequal, and full of knots; their bark reddiſh without, and greeniſh within. The xylo-balſamum is reputed good to ſtrengthen the brain and ſtomach, and to expel poiſon.

XYLOCASIA, in the materia medica, the ſame with the caſſia lignea. See the article CASSIA.

XYLON, the PRICKLY COTTON-TREE, in botany, a genus of the *polyandria-monogynia* claſs of plants, the corolla whereof conſiſts of a ſingle petal, divided into five oval, hollow, patent ſegments; the fruit is a large, oblong, turbinated capſule, formed of five woody valves, and containing five cells; the ſeeds are roundiſh, and fixed to a columnar pentagonal receptacle, and have a quantity of fine down, or cotton, adhering to them.

XYLON is alſo a name given to the goſſypium. See GOSSYPIUM and COTTON.

XYLOSTEUM, in botany, a name given by Tournefort to the lonicera of Linnæus. See the article LONICERA.

XYNOECIA, in grecian antiquity, an anniverſary feaſt, obſerved by the Athenians, in honour of Minerva, upon the ſixteenth of Hecatombæon, in memory that, by the perſuaſion of Theſeus, they left their country-ſeats, in which they lay diſperſed here and there in Attica, and united together in one body.

XYRIS, in botany, a genus of the *triandria-monogynia* claſs of plants, the flower of which conſiſts of three plain, patent, large, crenated petals, with narrow ungues, of the length of the cup; The fruit is a roundiſh, trilocular, trivalvar capſule, within the cup, with a great number of very ſmall ſeeds.

XYSTARCHA, in antiquity, the maſter or director of the xyſtus. In the greek gymnaſium, the xyſtarcha was the ſecond officer, and the gymnaſiarcha the firſt; the former was his lieutenant, and preſided over the two xyſti, and all exerciſes of the athletæ therein.

XYSTUS, among the Greeks, was a long portico, open or covered at the top, where the athletæ practiſed wreſtling and running: the gladiators who practiſed therein, were called xyſtici.

Among the Romans, the xyſtus was only an alley, or double row of trees, meeting like an arbour, and forming a ſhade to walk under.

Y.

Y, or y, the twenty-third letter of our alphabet: its ſound is formed by expreſſing the breath with a ſudden expanſion of the lips from that configuration by which we expreſs the vowel *u*. It is one of the ambigenial letters, being a conſonant in the beginning of words, and placed before all vowels, as in *yard*, *yield*, *young*, *&c.* but before no conſonant. At the end of words it is a vowel, and is ſubſtituted for the ſound of *i*, as in *try*, *deſcry*, *&c.* In the middle of words it is not uſed ſo frequently as *i* is, unleſs in words derived from the greek, as in *chyle*, *empyreal*, *&c.* though it is admitted into the middle of ſome pure engliſh words, as in *dying*, *flying*, *&c.* The Romans had no capital of this letter, but uſed the ſmall one in the middle and laſt ſyllables of words, as in *coryambus*, *onyx*, *martyr*. Y is alſo a numeral, ſignifying 150, or, according to Baronius, 159; and with a daſh a-top, as $\overline{Y}$, it ſignified 150,000.

YACHT, or YATCH, a veſſel with one deck, carrying from four to twelve guns. See the article SHIP.

YARD, a meaſure of length uſed in England and Spain, chiefly to meaſure cloth, ſtuffs, *&c.* See MEASURE.

YARD, in anatomy. See PENIS.

YARD-LAND is taken to ſignify a certain quantity of land, in ſome counties being fifteen acres, and in others twenty; in ſome twenty-four, and in others thirty and forty acres.

YARDS *of a ſhip*, are thoſe long pieces of timber which are made a little tapering at each end, and are fitted each athwart its proper maſt, with the ſails made faſt to them, ſo as to be hoiſted up, or lowered down, as occaſion ſerves. They have their names from the maſts unto which they belong. As for the length of the main-yard, it is uſually five ſixths of the length of the keel, or ſix ſevenths of the length of the main-maſt. Their thickneſs is commonly $\frac{1}{4}$ of an inch for every yard in length. The length of the main-top-yard is two fifths of the main-yard; and the fore-yard four fifths thereof. The ſprit-ſail-yard, and croſs jack-yard are half the mizzen-yard; and the thickneſs of the mizzen-yard and ſprit-ſail yard is half an inch for every yard in length. All ſmall yards are half the great yards from cleat to cleat. When a yard is down a portlaſt, it gives the length of all top-ſail-ſheets, lifts, ties, and bunt-lines, as alſo of the leech-lines and halliards, meaſuring from the hounds to the deck: and when it is hoiſted, it gives the length of clew-lines, clew-garnets, braces, tackles, ſheets, and bow-lines.

There are ſeveral ſea-terms relating to the management of the yards; as, ſquare the yards; that is, ſee that they hang right a-croſs the ſhip, and no yard-arm traverſed more than another: top the yards, that is, make them ſtand even. To top the main and fore-yards, the clew-lines are the moſt proper; but when the top-ſails are ſtowed, then the top-ſail-ſheets will top them.

YARD-ARM is that half of the yard that is on either ſide of the maſt, when it lies athwart the ſhip.

YARDS alſo denotes places belonging to the navy, where the ſhips of war, *&c.* are laid up in harbour. There are, belonging to his majeſty's navy, ſix great yards, *viz.* Chatham, Deptford, Woolwich, Portſmouth, Sheerneſs, and Plymouth; theſe yards are fitted with ſeveral docks, wharfs, lanches, and graving places, for the building, repairing, and cleaning of his majeſty's ſhips; and therein are lodged great quantities of timber, maſts, planks, anchors, and other materials there are alſo convenient ſtore-houſes in each yard, in which are laid up vaſt quantities of cables, rigging, ſails, blocks, and all other ſorts of ſtores, needful for the royal navy.

YARE, among ſailors, implies ready or quick: as, be yare at the helm; that is, be quick, ready, and expeditious at the helm. It is ſometimes alſo uſed for bright by ſeamen: as, to keep his arms yare; that is, to keep them clean and bright.

YARE, a river of Norfolk, which runs from weſt to eaſt, through that county, paſſing by Norwich, and falling into the German ſea at Yarmouth.

YARMOUTH,

YARMOUTH, a borough and port-town of Norfolk, ſituated on the German ſea, at the mouth of the river Yare, twenty miles eaſt of Norwich.

It ſends two members to parliament.

YARMOUTH, is alſo a borough-town of the Iſle of Wight, in Hampſhire, ſituated on the north-weſt coaſt of the iſland, ſix miles weſt of Newport.

It ſends two members to parliament.

YARN, wool or flax, ſpun into thread, of which they weave cloth. See the articles CLOTH, WOOL, &c.

Yarn is ordered after the following manner: after it has been ſpun upon ſpindles, ſpools, or the like, they reel it upon reels, which are hardly two feet in length, and have but two contrary croſs-bars, being the beſt, and the leaſt liable to ravelling. In reeling of fine yarn, the better to keep it from ravelling, you muſt, as it is reeled, with a tye-band of big twiſt, divide the ſlipping or ſkain into ſeveral leys, allowing to every ley eighty threads, and twenty leys to every ſlipping, if the yarn is very fine; otherwiſe leſs of both kinds. The yarn being ſpun, reeled, and in the ſlippings, the next thing is to ſcour it. In order to fetch out the ſpots, it ſhould be laid in lukewarm water for three or four days, each day ſhifting it once, wringing it out, and laying it in another water of the ſame nature: then carry it to a well or brook, and rinſe it till nothing comes from it but pure clean water: that done, take a bucking-tub, and cover the bottom thereof with very fine aſhen aſhes; and then having opened and ſpread the ſlippings, lay them on thoſe aſhes, and put more aſhes above, and lay in more ſlippings, covering them with aſhes as before; and thus lay one upon another, till all the yarn be put in: afterwards cover the uppermoſt yarn with a bucking cloth, and, in proportion to the bigneſs of the tub, lay therein a peck or two more of aſhes: this done, pour upon the uppermoſt cloth a great deal of warm water, till the tub can receive no more, and let it ſtand ſo all night. Next morning you are to ſet a kettle of clean water on the fire; and when it is warm, pull out the ſpiggot of the bucking tub, to let the water run out of it, into another clean veſſel; as the bucking-tub waſtes, fill it up again with the warm water on the fire: and as the water on the fire waſtes, ſo likewiſe fill that up with the lye that comes from the bucking-tub; ever obſerving to make the lye hotter and hotter, till it boils: then you muſt, as before, ply it with the boiling lye at leaſt four hours together, which is called the driving of a buck of yarn.

All this being done, for the whitning of it, you muſt take off the bucking-cloth; then putting the yarn with the lye-aſhes into large tubs, with your hands labour the yarn, aſhes, and lye pretty well together; afterwards carry it to a well, or river, and rinſe it clean; then hang it upon poles in the air all day, and in the evening take the ſlippings down, and lay them in water all night; the next day hang them up again, and throw water upon them as they dry, obſerving to turn that ſide outmoſt which whitens ſloweſt. After having done this for a week together, put all the yarn again into a bucking-tub, without aſhes, covering it as before with a bucking-cloth; lay thereon good ſtore of freſh aſhes, and drive that buck, as before, with very ſtrong boiling lye, for half a day, or more; then take it out, and rinſe it, hanging it up, as before, in the day-time, to dry, and laying it in water at night, another week: laſtly, waſh it over in fair water, and ſo dry it up. Your yarn being thus ſcoured and whitened, wind it up into round balls of a moderate ſize. See REEL.

Cable-yarn pays, on importation, for the hundred weight 7 s. $3\frac{5}{100}$ d. there is no drawback on exportation. Camel or mohair-yarn pays on importation for the hundred weight $5\frac{77\frac{1}{2}}{100}$ d. and draws back $5\frac{6\frac{1}{4}}{100}$ d. Cotton-yarn, not of the Eaſt-indies, on importation, pays per pound $2\frac{87\frac{1}{4}}{100}$ d. and on exportation draws back $2\frac{58\frac{3}{4}}{100}$ d. Cotton-yarn of the Eaſt-indies, on importation, pays per pound $4\frac{56}{100}$ d. and on exportation draws back $4\frac{27\frac{1}{2}}{100}$ d. Grogram-yarn, on importation, pays per pound $6\frac{93}{100}$ d. and on exportation draws back $6\frac{7\frac{1}{2}}{100}$ d. Iriſh yarn, in packs containing four hundred weight, at ſix ſcore pound to the hundred, if by certificate, is free from any duty on importation. Sail-yarn, on importation, pays per pound $1\frac{4\frac{5}{8}}{100}$ d. and on exportation draws

back 1 $\frac{29\frac{3}{8}}{100}$ d. For every pound weight of french, dutch, muſcovia or ſpruce, and all other raw linnen-yarn, there is a duty of 1 d. on importation; and no draw-back on exportation. Wick-yarn on importation, pays, the dozen pound, 2s. 1 $\frac{85\frac{1}{4}}{100}$ d. and on exportation draws back 1 s. 11 $\frac{28\frac{3}{4}}{100}$ d. Woollen or bay-yarn, on importation, pays the hundred 12 s. 10 d. and on exportation draws back 11 s. 3 d. Worſted-yarn, being two or more threads twiſted or thrown, on importation, pays the pound 2 $\frac{87\frac{1}{4}}{100}$ d. and on exportation draws back 2 $\frac{58\frac{3}{4}}{100}$ d.

YARRINGLE, a kind of inſtrument, or reel, on which hanks of yarn are wound, to clues or balls. See REEL.

YARUM, a market-town of the north riding of Yorkſhire, ſituated on the river Tees, thirty miles north of York.

YAWS, in the ſea-language. A ſhip is ſaid to make yaws, when ſhe does not ſteer ſteady, but goes in and out when there is a ſtiff gale.

YAWS, a diſtemper endemial to Guinea and the hotter climates in Africa. It makes its firſt appearance in little ſpots on the cuticle, not bigger than a pin's point, which increaſe daily, and become protuberant, like pimples. Soon after, the cuticle frets off, and then, inſtead of pus or ichor, there appears white ſloughs or ſordes, under which is a ſmall red fungus. Theſe increaſe gradually, ſome to the ſize of a ſmall wood ſtrawberry, others to that of a raſpberry, others again exceed the largeſt mulberry, which in ſhape they very much reſemble. In the mean time the black hair growing in the yaws turns to a tranſparent white. It is not eaſy to determine the exact time which the yaws take in going through their different ſtages. Luſty well fed negroes have had ſeveral yaws as big as a mulberry in a month's time, whereas the low in fleſh, with a ſcanty allowance have paſſed three months without their growing to the ſize of a ſtrawberry. They appear in all parts of the body, but are moſt plentiful, and of the largeſt ſize, about the groin, privy parts, anus, armpits, and face: they are largeſt when feweſt in number, and *vice verſa*. They are not painful, unleſs handled roughly, nor cauſe a loſs of appetite. They continue long without any ſenſible alteration; and ſome are of opinion, that as ſoon as the funguſes become dry, the infection is exhauſted.

The yaws are not dangerous, if the cure is ſkillfully managed at a proper time. But if the patient has been once ſalivated, or has taken any quantity of mercury, and his ſkin once cleared thereby, the cure will be very difficult, if not impracticable. The following form of medicine is recommended as a cure: take of flowers of ſulphur, one ſcruple; of camphor diſſolved in ſpirits of wine, five grains; of theriaca andromachi, one dram; and as much of ſyrup of ſaffron as will make a bolus. Let the bolus be taken at going to reſt, which muſt be repeated for a fortnight or three weeks, till the yaws come to the height. Then throw the patient into a gentle ſalivation, with calomel given in ſmall doſes, without farther preparation. After ſalivation, ſweat the patient twice or thrice, on a frame or chair, with ſpirit of wine, and give the following electuary, *viz.* of æthiops mineral, one ounce and a half, of gum guaiacum, half an ounce; theriaca andromachi, and conſerve of red roſes, of each one ounce; oil of ſaſſafras, twenty drops; and as much of ſyrup of ſaffron as is requiſite for an electuary. Of this let two drams be taken in the morning and at night. He may likewiſe drink the decoction of guaiacum and ſaſſafras, fermented with molaſſes, for his conſtant drink, while the electuary is taking, and a week or a fortnight after the electuary is ſpent. Sometimes there remains one large yaw, high and knobed, red and moiſt; this is called the maſter-yaw. This muſt be conſumed an eighth or a tenth part of an inch below the ſkin, with corroſive red mercury, and burnt alum, of each an equal quantity, and digeſted with one ounce of yellow baſilicon, and one dram of red corroſive mercury, and cicatrized with lint preſſed out of ſpirit of wine, and with the vitriol-ſtone.

YAXLEY, a market-town of Huntingtonſhire, twelve miles north of Huntington.

YEAR, *annus*, the time the ſun takes to go thro' the twelve ſigns of the zodiac. See ZODIAC and EARTH.

This is properly the natural or tropical year, and contains 365 days, 5 hours, and 49 minutes. As for the gregorian, the civil, the ſolar or aſtronomical, the biſſextile, and

and the platonic years, ſee them under the articles GREGORIAN, CIVIL, &c.

The julian year derives both its name and inſtitution from Julius Cæſar the dictator; for before his time the form of the roman year was ſo corrupted by the indiſcretion of the pontiffs, in whoſe hands the power of intercalation was lodged, that the winter-months fell back to the autumn, and thoſe of autumn to the ſummer. To remedy theſe inconveniences, the dictator not only added to that year, in which he ſet about the reformation of the kalendar, the common intercalation of 23 days, between the 23d and 24th days of February, purſuant to Numa Pompilius's inſtitution, but likewiſe 67 days more between November and December, ſo that this year contained 445 days. This done, he inſtituted a ſolar year of 365 days and 6 hours, purſuant to what he had learned from the Egyptians, and every fourth year he ordered a day to be added. See GREGORIAN, BISSEXTILE, and EMBOLISMIC.

The Arabs, Saracens, and Turks count their year by the motion of the moon, making it conſiſt of 12 moons or months, whereof ſome have 30, and ſome 29 days, alternately; and theſe altogether make 354 days, and conſtitute a common lunar year; and 354 days, 8 hours, 48 minutes, 38 ſeconds, 12 thirds, conſtitute what is called a lunar aſtronomical year.

The Greeks counted their year by the motion of both ſun and moon; and finding that there was 11 days difference between the lunar and ſolar years, at firſt they added an intercalary month every two years, containing 22 days. Afterwards conſidering the 6 hours alſo, they put their emboliſm off 4 years, and then making the three firſt years to contain 354 days each, this made the fourth year to have 399 days: and to make this intercalation the more remarkable, they inſtituted the olympic games on every ſuch fourth year, whence came the computation by olympiads. See the article OLYMPIAD.

The Egyptians had two ſorts of years, the erratic and the fixed, or actiac: the erratic was called the nabonaſſarean, from the epocha which takes its riſe from Nabonaſſar king of the Chaldees. As it neglects the 6 hours, which in the julian form make a leap day once in four years, its beginning anticipates the julian every fourth year by a day, and therefore it is juſtly called erratic. The anticipation of one day in four years gains of the julian years one in 1460, ſo that 1461 nabonaſſarean years make but 1460 julian years. The fixed egyptian year obſerves the julian form of 365 days and 6 hours, making a leap-day of the ſix hours once in four years. It differs from the julian in this, that its months are the ſame with thoſe of the nabonaſſarean, that it begins on Aug. 29, inſtead of January 1; or on Aug. 30, if it be a leap-year; that it takes in the leap-day, not in February, but at the end of the year. See EPOCHA and INTERCALARY.

The perſian erratic year goes by the name yezdegerdic, by reaſon that the perſian epocha commences from the death of Yezdegird, the laſt perſian king, who was killed by the Saracens. It conſiſts of twelve months, containing thirty days each, and five ſupernumerary ones; ſo that it differs from the nabonaſſarean only in the names of the months, and the commencement of the epocha. See MONTH.

The gelalean year, us'd alſo by the Perſians, is very well adapted to the ſolar motions. It takes in a leap-day every fourth year, but every ſixth or ſeventh turn it throws it forward to the fifth year, by which means the equinoxes and ſolſtices are fixed to almoſt the ſame days of the months.

The ſyriac year conſiſts of 365 days and 6 hours, being divided into 12 months of equal extent with thoſe of the julian year, to which they correſpond: this year begins October 1, ſo that the month called Tiſhrim, agrees with our October.

The aſtronomical year is two-fold, *viz.* the tropical and ſidereal: by the latter is meant that ſpace of time which the ſun takes in departing from a fixed ſtar, and returning to the ſame again. This year conſiſts of 365 days, 6 hours, and 10 minutes.

As the form of the year is various among different nations, ſo likewiſe is the beginning: the Jews began their eccleſiaſtical year with the new moon of that month whoſe full moon happens next after the vernal equinox; and every ſeventh year they kept as a ſabbatic year, during which they let their land lie at reſt. The antient jewiſh year was made to agree with the ſolar year, by the adding of 11, and ſometimes of 12 days, at the end of the year, or by an emboliſmic month.

The beginning of the athenian or attic year was reckoned from that new moon, the full moon of which comes next after the ſummer ſolſtice. The macedonian lunar year agrees with the athenian, excepting

that the former takes its beginning, not from the ſummer-ſolſtice, but from the autumnal equinox. The ethiopic year is a ſolar year, agreeing with the actiac or fixed egyptian year, except in this, that the names of the months are different, and that it commences, with the egyptian year, on Aug. 29, of the julian year. The arabian or mahometan year is called alſo that of the hegira, becauſe the calculation of theſe years runs from the epocha of the hegira, when Mahomet fled from Mecca to Medina they had twelve civil months in a year, which contained 29 and 30 days, by turns, abating for their leap-years, in which the month Dulheggia has always 30. See HEGRIA.

The mahometans begin their year when the ſun enters aries; the Perſians, in the month anſwering to our June; the Chineſe, and moſt of the Indians, begin it with the firſt moon in March: at Rome there are two ways of computing the year, the one begining at the nativity of our Lord, which the notaries uſe; the other in March, on occaſion of the incarnation, and it is from this the bulls are dated. The civil or legal year, in England, as well as the hiſtorical year, commences Jan. 1, by the late act for the alteration of the ſtyle: the church, as to her ſolemn ſervice, begins the year on the firſt Sunday in Advent, which is always that next St. Andrew's day.

YEAR AND DAY, in law, ſignifies a certain time that by law determines a right, or works preſcription in divers caſes; as in the caſe of an eſtray, if the owner do not challenge it within that time, it becomes forfeited to the lord; ſo of a wreck, &c. The like time is given to proſecute appeals in; and where a perſon wounded, dies in a year and a day after the wound received, it makes the offender guilty of murder. See ESTRAY, &c.

There is alſo year and day and waſte, which is taken to be part of the king's prerogative, whereby he challenges the profits of the lands and tenements for a year and a day, of thoſe that are attainted of petty treaſon or felony; and the king may cauſe waſte to be made on the lands, &c. by deſtroying the houſes, ploughing up the meadows and paſtures, rooting up the woods, &c. unleſs the lord of the fee agrees with him for the redemption of ſuch waſte.

YEARN, in hunting, ſignifies to bark as beagles properly do at their prey.

YELLOW, one of the original colours of light. See COLOUR and LIGHT.

YELLOW, in dying, is one of the five ſimple and mother colours. See the articles COLOUR and DYING.

For the fineſt yellows, they firſt boil the cloth or ſtuff in alum or pot-aſhes, and give the colour with weld or wold.

Likewiſe turmeric gives a good yellow, though not the beſt.

There is alſo an indian wood, that gives a yellow colour bordering on gold. There is another ſort of yellow, made of ſavory; but this is inferior to them all.

With yellow, red of madder, and that of goat's hair prepared with madder, are made the gold yellow, aurora, thought-colour, macarate, iſabella, chamoiſe-colour, which are all caſts or ſhades of yellow.

Painters or enammellers make their yellow of maſticote, which is ceruſs raiſed to a yellow colour by the fire, or with oker. Limners and colourers make it with ſaffron, french berries, orcanette, &c. Mr. Boyle tells us a moſt beautiful yellow may be procured by taking good quick-ſilver, and three or four times its weight of oil of vitriol, and drawing off, in a glaſs-retort, the ſaline menſtruum from the metalline liquor, till there remains a dry ſnow-white calx at the bottom: on pouring a large quantity of fair-water on this, the colour changes to an excellent light yellow.

He ſays, he fears this colour is too coſtly to be uſed by painters; and he does not know how it would agree with every pigment, eſpecially oil-colours.

YELLOWS, a diſeaſe in a horſe, much the ſame with that called the jaundice in man. See the article JAUNDICE.

There are two kinds of it, the yellow and the black. The yellow is a very frequent diſorder, ſay the farriers, ariſing from obſtructions in the gall-pipe, or the little ducts opening into the ſame, occaſioned by viſcid or gritty matter lodged therein, or a plenitude and compreſſion of the neighbouring blood-veſſels, by means whereof the matter that ſhould be turned into gall, is taken up by the vein, and carried into the maſs of blood, which it tinctures yellow, ſo that the eyes, inſide of the lips, and other parts of the mouth capable of ſhewing the colour, appear yellow. The effect whereof is, that a horſe will be dull, heavy, and low-ſpirited, eaſily jaded by the leaſt labour or exerciſe, &c. The black is known by other ſymptoms: the whites of the eyes, mouth, and lips turn to a duſky colour, and not ſo clear and ſanguine

guine as before. For the cure of this diſeaſe, we are directed to diſſolve an ounce of mithridate in a quart of ale, or beer, and to give it the horſe lukewarm; or inſtead of mithridate, two ounces of venice-treacle; and if that is not to be had, three ſpoonfuls of common treacle.

This diſtemper is alſo incident to black cattle. The cure is, to bleed them in the ears, eyes, and in the tail; to put ſalt into their ears, and to rub them between your hands: and being blooded, give them two handfuls of ſalt down their throats, dry over night. In the morning let them have fenugreek, turmeric, long pepper, anniſe-ſeed, and liquorice, but two penny-worth in all, made into a powder, and given in a quart of ale milk-warm.

YELLOW-HAMMER, in ornithology, a ſpecies of frangilla, with a yellow head and a greyiſh yellow body. See the article FRANGILLA.

This is ſomewhat larger than the common ſparrow, and is an extremely beautiful bird: the head is large, the eyes have a hazel-coloured iris, the ears are patulous, the beak is robuſt and conic, and the ſides of the under chap of it are compreſſed, and of a ſingular form; the throat and belly is yellow, the breaſt has a rediſh tinge mixed with that colour, the ſhoulders are of a mixed green and grey, and the feathers which cover the body are black in their middle, but their edges have a tinge of green.

YEOMAN, the firſt or higheſt degree among the plebeians of England, next in order to the gentry. See the articles GENTLEMAN and COMMONS.

The yeomen are properly freeholders, who having land of their own, live on good huſbandry.

YEOMAN is alſo a title of office in the king's houſhold, of a middle place or rank between an uſher and a groom. See the articles USHER and GROOM.

YEOMEN *of the guard* were antiently two hundred and fifty men of the beſt rank under gentry, and of larger ſtature than ordinary, each being required to be ſix feet high.

At preſent there are but one hundred yeomen in conſtant duty, and ſeventy more not in duty; and as any of the hundred dies, his place is ſupplied out of the ſeventy.

They go dreſſed after the manner of king Henry VIII's time. They formerly had diet as well as wages, when in waiting, but this was taken off in the reign of queen Anne.

YEOVIL, a market town of Somerſetſhire, ſituated eighteen miles ſouth of Wells.

YERKING, in the manege, is when a horſe ſtrikes with his hind-legs, or flings and kicks back with his whole hind-quarters, ſtretching out the two legs nearly together, and even to their full extent. See AIR and LEAP.

YEST, YEAST, or BARM, a head, or ſcum, riſing upon beer or ale, while working or fermenting in the vat. See BREWING, MALT-LIQUORS, *&c.*

It is uſed for a leven or ferment in the baking of bread, as ſerving to ſwell or puff it up very conſiderably in a little time, and to make it much lighter, ſofter, and more delicate. When there is too much of it, it renders the bread bitter. See the articles BAKING and BREAD.

The faculty of medicine of Paris, by a decree of March 24, 1688, ſolemnly maintained it noxious to the health of the people: yet could not that prevent its progreſs.

YEW, *taxus*, in botany See TAXUS.

YEW, is alſo a term uſed by the ſalt-workers of Limington, and ſome other parts of England, to expreſs the firſt riſing of a ſcum upon the brine in boiling.

In the places where they uſe this term, they add no clariſying mixtures to the brine, for it ferments in the ciſterns, and all its foulneſs ſinks to the bottom, in form of a thin mud; they admit only the clear liquor into the pan, and boil this briſkly till it yews, that is, till a thin ſkin of ſalt appears upon its ſurface; they then damp the fire, and carefully ſkim off this film, and clear only the ſcratch, or calcareous earth, which ſeparates to the bottom.

They do not collect this into ſcratch-pans, as at many of the other works, but they rake it up to one ſide of the pan, and take it out; they then add a piece of butter, and continue the fire moderately ſtrong till the ſalt is granulated. They keep a briſker fire on this occaſion at Limington than in moſt of the other works, ſo that they will work three pans in twenty-four hours. See SALT.

YIELD, or SLACK *the hand*, in the manege, is to ſlack the bridle, and give the horſe head. See SLACK.

YLA, one of the weſtern iſlands of Scotland ſituated in the Iriſh ſea, weſt of Cantire.

YNCA, or INCA, an appellation antiently given

given to the kings of Peru, and the princes of their blood; the word literally ſignifying lord, king, emperor, and royal blood.

YOAK, or YOKE, in agriculture, a frame of wood, fitted over the necks of oxen, whereby they are coupled together, and harneſſed to the plough. See PLOUGH. It conſiſts of ſeveral parts, as the yoke, properly ſo called, which is a thick piece of wood, lying over the neck; the bow, which compaſſes the neck about; the ſtitchings and wreathings, which hold the bow faſt in the yoke; and the yoke-ring and ox-chain.

The Romans made the enemies they ſubdued, paſs under the yoke, which they called *ſub jugum mittere*, that is, they made them paſs under a ſort of *furcæ patibulares*, or gallows, conſiſting of a pike, or other weapon, laid acroſs two others, planted upright, in the ground. See the article FURCA.

YOAK *of Land*, *jugata terræ*, in our antient cuſtoms, was the ſpace which a yoke of oxen, that is, two oxen, may plow in one day. See HIDE and YARD-LAND.

Sea-YOAK. When the ſea is ſo rough, that the helm cannot be governed by the hands, the ſeamen make a yoak to ſteer by, that is, they fix two blocks to the end of the helm, and reeving two ſmall ropes thro' them, which they call falls, by having ſome men at each tackle, they govern the helm by direction. They have another way of making a ſea-yoak, by taking a double turn about the end of the helm with a ſingle rope, the ends being laid to the ſhip ſides, by means whereof they guide the helm. See HELM.

YOANGFU, a city of China, in the province of Huguam, ſituated on the river Kiam, eaſt long. 114°, north lat. 30° 40′

YOLK, or YELK, *vitellus*, the yellow part in the middle of an egg. See EGG.

YONNE, a river of France, which riſing in Burgundy, and running north through Nivernois and Champain, falls into the Seyne at Monterau ſur Yonne.

YORK, the capital city of Yorkſhire, ſituated on the river Ouſe, 180 miles north of London: weſt long. 50′, north lat. 54°. It is a large city, and has ſome good buildings in it, particularly the Cathedral, which is a gothic pile, equal to any thing of the kind in England. It is the ſee of an archbiſhop, and ſends two members to parliament.

New-YORK, one of the britiſh colonies in north America, which comprehending the Jerſeys, that frequently have the ſame governor, is ſituated between 72° and 74° of weſt long, and between 41° and 44° of north lat. bounded by Canada on the north; New-England on the eaſt; the american Sea on the ſouth; and Penſilvania, and the country of the Iroquois on the weſt.

New-YORK, the capital city of this province, is ſituated on an iſland in the mouth of Hudſon's river, in weſt long. 72° 30′, north lat. 41°.

YOUTH. See the article ADOLESCENCE. The renovation of youth has been much ſought after by chemical adepts; and many of them pretended to various ſecrets, for this purpoſe But unluckily, the death of the pretenders proved a ſufficient refutation of their doctrine. Paracelſus talks of the mighty things he could do with his *ens primum*; and even Mr. Boyle tells us ſome ſtrange things about the *ens primum* of balm. See the article ENS.

YOUTH, *juventus*, in the Pagan theology, a goddeſs worſhipped among the Romans, who, together with the gods Mars and Terminus, kept her place in the capitol along with Jupiter, when the other deities were turned out. Whence the Romans drew a lucky omen for the durableneſs of their empire.

YPRES, a ſtrong city of the auſtrian Netherlands, ſituated eaſt long. 2° 46′, north lat. 50° 54′.

YPSILOIDES, in anatomy, the third genuine ſuture of the cranium, thus called from its reſembling a greek υ or ypſilon. See SUTURE and SKULL.

YUCCA, the *Indian bread-plant*, in botany, a genus of the *hexandria monogynia* claſs of plants, the corolla whereof is of a campanulated ſhape, and formed of ſix large oval petals, cohering at the baſe; or of a ſingle petal, divided almoſt to the baſe into ſo many ſegments; the fruit is an oblong, obtuſely triangular capſule, with three furrows, formed of three valves, and containing three cells; the ſeeds are numerous, and incumbent in a double order. The yucca approaches very near to the aloe, but is a diſtinct genus. A kind of bread is made from the dried root of this plant by the indians, which much reſembles that made from the root of the caſſida or ſcutellaria of Linnæus. See the article SCUTELLARIA.

YVICA, a ſpaniſh iſland, ſituated in the Mediterranean Sea, between the province of Valencia, in Spain, and the iſland of Majorca: in 1° eaſt long. north lat. 39°, being about thirty miles long, and twenty-four broad.

Z.

Z, or z, the twenty-fourth and laſt letter, and the nineteenth conſonant of our alphabet; the ſound of which is formed by a motion of the tongue from the palate downwards and upwards to it again, with a ſhutting and opening of the teeth at the ſame time. This letter has been reputed a double conſonant, having the ſound *d s*; but ſome think with very little reaſon; and, as if we thought otherwiſe, we often double it, as in *puzzle*, *muzzle*, &c. Among the antients, Z was a numeral letter, ſignifying two thouſand, and with a daſh added a-top, $\overline{Z}$ ſignified two thouſand times two thouſand, or four millions.

In abbreviations this letter formerly ſtood as a mark for ſeveral ſorts of weights; ſometimes it ſignified an ounce and a half, and very frequently it ſtood for half an ounce; ſometimes for the eighth part of an ounce, or a dram troy weight; and it has in earlier times been uſed to expreſs the third part of an ounce, or eight ſcruples. ZZ were uſed by ſome of the antient phyſicians to expreſs myrrh, and at preſent they are often uſed to ſignify zinziber, or ginger.

ZAARA, or SARRA, one of the diviſions of Africa, ſituated under the tropic of cancer, is bounded by Bildulgerid, on the north; by the unknown parts of Africa, on the eaſt; by Nigritia, or Negroland, on the ſouth; and by the Atlantic ocean, on the weſt. This is a barren deſart, and ſo deſtitute of water, that the camels which paſs over it from Morocco to traffic with Negroland, are half loaded with water and proviſions.

ZABAC SEA, or PALUS MEOTIS. See the article MEOTIS.

ZACINTHA, STELLATED HAWK-WEED, in botany, the lapſona of Linnæus, a plant of the *ſyngeneſia-polygamia-æqualis* claſs, the compound flower of which is imbricated with about ſixteen equal and uniform hermaphrodite corollulæ; the partial corolla is monopetalous, ligulated, truncated, and quinquedentated; there is no pericarpium; the ſeed is ſingle, oblong, and cylindrically trigonal; the receptacle is naked and plain.

This genus comprehends the lampſana, hedypnois, zacintha, and rhagadiolus, or rhagadioloides of authors. In the lampſana the ſeeds are all naked, not ſurrounded by the ſquamæ of the cup. In the rhagadiolus, every ſquama of the cup incloſes a ſingle ſeed. In the zacintha, the marginal ſeeds are each ſurrounded by a ſquama of the cup, and the central ones are coronated with a ſhort ſimple down. In the hedypnois the marginal ſeeds are each ſurrounded in a ſquama of the cup, and the central ones are coronated with a cup divided into five denticles.

ZAFFER, or ZAFFRE, in chemiſtry, the name of a blue ſubſtance, of the hardneſs and form of a ſtone; and generally ſuppoſed to be a native foſſil.

It is in reality, however, a preparation of cobalt; the calx of that mineral being mixed with powdered flints and wetted with water to bring it into this form. See the article COBALT.

To prepare this for uſe in the glaſs-trade, put it in groſs pieces into earthen pans, and let it ſtand half a day in the furnace; then put it into an iron-ladle to be heated red hot in the furnace; take it out while thus hot, and ſprinkle it with ſtrong vinegar; and when cold, grind it on a porphyry to an impalpable powder; then throw this into water in glazed earthen pans; and when it has been well ſtirred about, let it ſettle, and pour off the water: repeat this waſhing often, and the foulneſs of the zaffre will be thus wholly ſeparated: dry the powder, and keep it for uſe.

ZAIM, a portion of land allotted for the ſubſiſtance of a horſeman in the turkiſh militia, called alſo timar. See the article TIMAR.

ZAIRAGIA, a kind of divination in uſe among the Arabs, performed by means of divers wheels or circles placed concentric to one another, and noted with ſeveral letters which are brought to anſwer to each other by moving the circles according

cording to certain rules. See the article DIVINATION.

ZAMORA, a city of Spain, in the province of Leon, ſituated on the river Douro, thirty-two miles north of Salamanca: weſt long. 6°, north lat. 41° 30′.

ZAMOSKI, a town of Poland, in the province of Red Ruſſia, and palatinate of Beltz, ſituated an hundred and ten miles north-eaſt of Cracow.

ZANGUEBAR, a country on the eaſt coaſt of Africa, ſituated in ſouthern latitude between the equator and the tropic of capricorn, being bounded by the country of Anian, on the north; by the Indian ocean, on the eaſt; by Caffraria, on the ſouth, and by the unknown parts of Africa, on the weſt.

ZANNICHELLIA, in botany, a genus of the *monoecia-monandria* claſs of plants, the male-flower of which conſiſts only of a ſingle ſtamen; it has neither calyx nor corolla. In the female-flower the calyx is compoſed of a ſingle leaf; there is no corolla; the germina are about four; the ſeeds, which are oblong and accuminated on both ſides, are as many.

ZANONIA, in botany, a genus of the *dioecia-pentandria* claſs of plants; the calyx of the male-flower is formed of three leaves; the corolla is formed of a ſingle petal, divided into five parts. The calyx of the female-flower is alſo compoſed of three leaves, and the corolla formed of a ſingle petal, divided into five ſegments; the fruit is a long, very large, truncated berry, attenuated at the baſe; it contains three cells, placed under the receptacle: there are two plane-oblongo-roundiſh ſeeds in each cell.

ZANONIA, in botany, is alſo Plumier's name for the commelina of Linnæus. See the article COMMELINA.

ZANTE, an iſland in the Mediterranean-ſea, ſituated eaſt long. 21° 30′, north lat. 37° 50′, being about twenty-four miles long, and twelve broad. The chief town is Zant, and is ſituated on the eaſt ſide of the iſland, being well fortified and defended by a caſtle.

ZAPATA, or SAPATA, a kind of feaſt or ceremony held in Italy, in the courts of certain princes, on St. Nicholas's day; wherein people hide preſents in the ſhoes or flippers of thoſe they would do honour to, in ſuch a manner as may ſurprize them on the morrow, when they come to dreſs; being done in imitation of the practice of St. Nicholas, who uſed, in the night-time, to throw purſes of money in at the windows, to marry poor maids withal.

ZARA, a city of Dalmatia, ſituated on the gulph of Venice: eaſt long. 17°, north lat. 44°.

ZARNICH, in natural hiſtory, the name of a genus of foſſils; the characters of which are theſe: they are inflammable ſubſtances, not compoſed of plates or flakes, but of a plain, ſimple, and uniform ſtructure, not flexile nor elaſtic, ſoluble in ore, and burning with a whitiſh flame, and noxious ſmell like garlic. Of this genus there are four known ſpecies: 1. A red one, which is the true ſandarach. See the article SANDARACH. 2. A yellow one, found in great abundance in the mines of Germany, and frequently brought over to us among, and under the name of, orpiment. 3. A greeniſh one, very common in the mines of Germany, and ſold in our colour-ſhops under the name of a coarſe orpiment. This is alſo found in our own country among the tin mines of Cornwall. And, 4. A whitiſh one, a very remarkable ſubſtance, which has the property of turning black ink into a fine florid red. This is common in the mines of Germany, but is of little value. See ORPIMENT.

ZARNAW, a city of Poland, in the province of little Poland and palatinate of Sandomir, ſituated eaſt long. 20°, north lat. 51° 30′.

ZATMAR, a town of Hungary, ſituated forty-five miles eaſt of Tockay.

ZATOR, a town of Poland, ſituated on the river Viſtula, fourteen miles weſt of Cracow.

ZEA, INDIAN CORN, in botany, a genus of the *monoecia triandria* claſs of plants. In the male-flower the calyx is a biflorous glume, and has no ariſtæ, or awns; the corolla is alſo a glume without awns. In the female-flower the calyx is a glume formed of two valves; the corolla is alſo a glume formed of two valves; the ſtyle is ſimple, filiform, and pendulous; the ſeeds are ſingle, and are immerſed in a long receptacle.

ZEAL, ζηλος, the exerciſe of a warm animated affection, or paſſion, for any thing. See the article PASSION.

The greek philoſophers make three ſpecies of zeal. The firſt of envy, the ſecond of emulation or imitation, the third of piety or devotion, which laſt makes what the divines call a religious zeal. See ENVY and EMULATION.

ZEALAND,

ZEALAND, the chief of the daniſh iſlands, is ſituated at the entrance of the Baltic-ſea, bounded by the Schaggerrac-ſea, on the north; by the Sound, which ſeparates it from Schonen, on the eaſt; by the Baltic-ſea, on the ſouth; and by the ſtrait called the great Belt, which ſeparates it from the iſland of Funen, on the weſt; being of a round figure, near two hundred miles in circumference: the chief town is Copenhagen.

ZEALAND, is alſo a province of the United Netherlands, conſiſting of eight iſlands, which lie in the mouth of the river Scheld, bounded by the province of Holland, from which they are ſeparated by a narrow channel, on the north; by Brabant, on the eaſt; by Flanders, from which they are ſeparated by one of the branches of the Scheld, on the ſouth; and by the German-ocean, on the weſt.

ZEALOTS, an antient ſect of the Jews, ſo called from their pretended zeal for God's laws, and the honour of religion. The zealots were a moſt outrageous and ungovernable people; and on pretence of aſſerting God's laws, and the ſtrictneſs and purity of religion, aſſumed a liberty of queſtioning notorious offenders without ſtaying for the ordinary formalities of law. Nay, when they thought fit, they executed capital puniſhments upon them with their own hands. They looked upon themſelves as the true ſucceſſors of Phineas, who out of a great zeal for the honour of God, did immediate execution upon Zimri and Cozbi; which action was ſo pleaſing to God, that he made with him and his ſeed after him the covenant of an everlaſting prieſthood.

ZEBLICIUM *marmor*, in natural hiſtory, a name given by ſeveral authors to a ſoft green marble variegated with black and white; and though the authors who have deſcribed it have not obſerved it, yet it no way differs from the white ophites of the antients. See the articles MARBLE and OPHITES.

ZEBRA, the WILD ASS, in zoology, a ſpecies of equus, tranſverſly ſtriated. See HORSE and ASS.

This is an extremely beautiful animal, and though in colouring ſo much different from all other kinds and varieties of equus, agrees with it in all other reſpects: it is about equal to the common aſs in ſize, but of a much more elegant figure; the head is ſmall and ſhort, the ears are long, the eyes are large and bright, and the mouth conſiderably large; the neck is long and ſlender, but elegantly turned; the body is rounded, and ſmall in compariſon of that of the common aſs; the legs are long and ſlender, the tail long and beautiful, but hairy only at the end. See plate CCCII. fig. 1.

The whole animal is party-coloured, or beautifully ſtriped in a tranſverſe direction, with long and broad ſtreaks, alternately of a deep, gloſſy, and ſhining browniſh and whitiſh, with ſome abſolutely black. It is a native of many parts of the Eaſt.

ZECHARIAH, a canonical book of the Old Teſtament, containing the predictions of Zechariah, the ſon of Barachia, and grandſon of Iddo. He is the eleventh of the twelve leſſer prophets. Zechariah entered upon the prophetic office at the ſame time with Haggai, and was ſent to the Jews upon the ſame meſſage, to reprove them for their backwardneſs in erecting the temple, and reſtoring divine worſhip; but eſpecially for the diſorder of their lives and manners, which could not but derive a curſe upon them. By ſeveral notable viſions and types, he endeavours to confirm their faith, and eſtabliſh their aſſurance concerning God's providence with them, and care over them; and as a proof and demonſtration of this, he interſperſes the moſt comfortable promiſes of the coming of the kingdom, the temple, the prieſthood, the victory, the glory of Chriſt the branch. Nor does he forget to aſſure them of the ruin of Babylon, their moſt implacable enemy. This prophet is the longeſt and moſt obſcure of all the leſſer prophets, his ſtyle being interrupted and without connection.

ZEDOARY, in the materia medica, a root, the ſeveral pieces of which differ ſo much from one another in ſhape, that they have been divided into two kinds, as if two different things, under the names of the long and round zedoary, being only the ſeveral parts of the ſame root.

The long pieces of zedoary are of a very ſingular figure; they are not of the nature of the common long roots of plants, but are, themſelves, properly tubera or glandules, as well as the round ones, differing from them in nothing but their oblong figure: they are two, three, or four inches in length, and of the thickneſs of a man's finger; not large at one end and tapering away to the other, but thickeſt in the middle, and growing gra-

dually ſmaller to each end, where they terminate in an obtuſe point each way: they are of a tolerable ſmooth ſurface, except that they have ſome little protuberances in ſeveral parts from which fibres have originally grown: they are of a very cloſe and compact texture, conſiderably heavy, and very hard; they will not cut eaſily with a knife; when cut, they ſhew a fine, ſmooth, and gloſſy ſurface; they are of a pale greyiſh colour on the outſide, with a faint mixture of brown in it, and are of a dead whitiſh hue within: they are not eaſily powdered in the mortar; their ſmell, while bruiſing, is very remarkable, and is highly aromatic, and of a bitteriſh taſte. The round zedoary has all the ſame characters with this, and differs only in figure, being ſhort and roundiſh, of the ſize of a ſmall walnut, ſmooth on the ſurface, except where the bundles of fibres have adhered, and generally running into a ſharp point at the end.

Zedoary is to be choſen freſh, ſound, and hard, in large pieces; it matters not as to ſhape, whether long or round; of a ſmooth ſurface, and of a ſort of fatty appearance within, too hard to be bitten by the teeth, and of the briſkeſt ſmell that may be; ſuch as is friable, duſty, and worm-eaten, is to be rejected.

The antient Greeks were wholly unacquainted with zedoary; there is no mention of any ſuch drug in the works of Dioſcorides or Galen. The Arabians, however, were well acquainted with it; they mention it ſometimes under the name of zedoary, and ſometimes under that of zerumbeth, but are ſo ſhort in their deſcriptions, and ſo at variance among one another, that it is not eaſy to aſcertain their meaning, as to the diſtinction, if they originally meant any, between the ſubſtances expreſſed by theſe two names.

Serapio and Rhazes uſe the words zedoaria and zerumbeth as ſynonymous, and declare both to mean only the ſame root. Avicenna, on the contrary, diſtinguiſhes the zedoary and zerumbeth, and even talks of two kinds of zedoary. Others of them make the zarnab they ſpeak of different both from the zedoary and zerumbeth; but Serapio, an author as much to be depended upon for his accuracy as any of them, declares zedoary, zerumbeth, and zarnab, all to be the ſame thing.

Zedoary, both of the long and round kind, is brought us from China; and we find by the Arabians, that they alſo had it from the ſame place. The round tubera are leſs frequent than the long, and ſome of them have, therefore, ſuppoſed them the produce of a different and more rare plant; but this is not ſo probable as that the general form of the root is long, and the round tubera are only luſus naturæ, and leſs frequent in it.

The plant which produces it, is one of the claſs of the herbæ bulboſis affines of Mr. Ray. It is deſcribed, in the Hortus Malabaricus, under the name of the malan kua. Zedoary, diſtilled with common water, affords a thick and denſe eſſential oil, which ſoon concretes of itſelf into a kind of camphor, and on this oil its virtues principally depend. It is a ſudorific, and is much recommended by ſome in fevers, eſpecially of the malignant kinds. It is alſo given with ſucceſs as an expectorant in all diſorders of the breaſt, ariſing from a tough phlegm, which it powerfully incides and attenuates; it is alſo good againſt flatulencies, and in the cholic; it ſtrengthens the ſtomach, and aſſiſts digeſtion; and, finally, is given with ſucceſs in nervous caſes of all kinds. It is not an ingredient in any of our ſhop-compoſitions. It was in the Philonium Romanum of the late London Diſpenſatory, but it is now omitted in the Philonium Londinenſe of this: in extemporaneous perſcriptions it is ſeldom given ſingly, but is a common ingredient in reſtorative powders and infuſions. Its doſe is from five to ten grains in powder, and from a drachm to two drachms to the pint in infuſion.

ZEIGINHEIM, a town of Germany, in the landgraviate of Heſſe-Caſſel, ſituated thirty miles ſouth of Heſſe-Caſſel city.

ZEITS, a town of Germany, in the circle of Upper Saxony, ſituated twenty-four miles ſouth-weſt of Leipſic.

ZELL, a city of Germany, in the circle of Lower Saxony, capital of the dutchies of Zell and Lunenburg, ſituated at the confluence of the rivers Aller and Fuhſe, thirty miles north of Hanover, and forty ſouth of Lunenburg: eaſt long. 10°, north lat. 52° 52′.

ZEMBLA NOVA. See NOVA-ZEMBLA.

ZEND, or ZENDAVESTA, a book containing the religion of the magians, or worſhip-

worſhippers of fire, who were diſciples of the famous Zoroaſter. See MAGI.

This book was compoſed by Zoroaſter during his retirement in a cave, and contained all the pretended revelations of that impoſtor. The firſt part contains the liturgy of the magi, which is uſed among them in all their oratories and fire-temples to this day; they reverence it as the chriſtians do the bible, and the mahometans the koran. There are found many things in the zend taken out of the ſcriptures of the Old Teſtament, which Dr. Prideaux thinks is an argument that Zoroaſter was originally a Jew. Great part of the pſalms of David are inſerted: he makes Adam and Eve to have been the firſt parents of mankind, and gives the ſame hiſtory of the creation and deluge as Moſes does, and commands the ſame obſervances about clean and unclean beaſts, the ſame law of paying tythes to the ſacerdotal order, with many other inſtitutions of jewiſh extraction. The reſt of its contents are an hiſtorical account of the life, actions, and prophecies of its author, with rules and exhortations to moral living. The mahometans have a ſect which they call zendikites, who are ſaid to be the ſadducees of mahometaniſm, denying providence and the reſurrection, believing the tranſmigration of ſouls, and following the zend of the magi.

ZENITH, in aſtronomy, the vertical point; or a point in the heavens directly over our heads. See NADIR, VERTEX, and VERTICAL.

The zenith is called the pole of the horizon, becauſe it is ninety degrees diſtant from every point of that circle. See the articles POLE and HORIZON.

ZENITH-DISTANCE, is the complement of the meridian altitude of any heavenly object; or it is the remainder, when the meridian altitude is ſubtracted from ninety degrees. See COMPLEMENT and ALTITUDE.

ZENSUS, in arithmetic, a name given to a ſquare number, or the ſecond power, by ſome authors. See SQUARE and POWER.

ZEPHANIAH, a canonical book of the Old Teſtament, containing the predictions of Zephaniah the ſon of Cuſhi, and grandſon of Gedaliah; being the ninth of the twelve leſſer prophets. He propheſied in the time of king Joſiah, a little after the captivity of the ten tribes, and before that of Judah; ſo that he was contemporary with Jeremiah. He freely publiſhes to the Jews, that what increaſed the divine wrath againſt them, was their contempt of God's ſervice, their apoſtacy, their treachery, their idolatry, their violence and rapine, and other enormities: ſuch high provocations as theſe, rendered their deſtruction terrible, univerſal, and unavoidable: and then, as moſt of the prophets do, he mingles exhortations with repentance, as the only expedient in theſe circumſtances.

ZEPHYR, *zephyrus*, the weſt-wind; or that which blows from the cardinal point of the horizon oppoſite to the eaſt. See WIND, WEST, and COMPASS.

ZEST, the woody thick ſkin, quartering the kernel of a walnut; preſcribed by ſome phyſicians, when dried and taken with white wine, as a remedy againſt the gravel.

Zeſt is alſo uſed for a chip of orange or lemon-peel; ſuch as is uſually ſqueezed into ale, wine, &c. to give it a flavour; or the fine ethereal oil which ſpurts out of that peel on ſqueezing it.

ZETETIC METHOD, in mathematics, the method made uſe of to inveſtigate or ſolve a problem.

ZEUGMA, a figure in grammar, whereby an adjective or verb which agrees with a nearer word, is alſo, by way of ſupplement, referred to another more remote.

ZEUS, in ichthyology, a genus of the acanthopterygious order of fiſhes, the characters of which are as follow: the body is very broad, thin, and compreſſed; the ſcales are rough; there is only one fin on the back, but it is very long, and cut in ſo deeply near the anterior part, that it appears to be two fins; the branchioſtege membranes do not conſiſt of parallel bones, as in other fiſh, but have a number of oſſicles of various figures, ſome of them placed longitudinally, ſome tranſverſely, and ſome obliquely.

To this genus belong the doree, the indian doree, and the aper or riondo. See the articles DOREE and RIONDO.

ZIBETHICUS, ZIBETHICUM ANIMAL, the CIVET CAT, in zoology, the grey meles, with uniform claws. See the article MELES.

It was long before the form of this creature, to whom we owe the civet, was known, and long after this before it could be determined to what genus of quadrupeds it belonged: it was firſt ſup-

poſed of the cat, and afterwards of the dog-kind; but it is truly one of the badger ſpecies. It is a large and fierce animal; (See plate CCCII. fig. 2.) its ſize is that of the common badger, but its body is not ſo bulky; the head is large, oblong, and conſiderably thick; the forehead is depreſſed; the ſnout is rounded and thick; the noſe turns up a little; the mouth is wide, and is furniſhed in a very formidable manner, with teeth; and there are a few rigid but very long whiſkers placed about it; the eyes are ſmall, the ears large, obtuſe, and patulous; the neck is long, rigid, and thick; the tail long, and reſembling that of the common cat; it is covered with hair, and there runs a ridge of the ſame hair all along the top of the back. The whole animal is of a light ſilvery colour, variegated in a beautiful manner, with large ſpots of black; the legs are very robuſt, almoſt intirely black, the feet are armed with very long and ſharp claws; under the tail is ſituated the bag, in which is contained the perfume we call civet; and its ſituation is the ſame with that which contains the white ſebaceous matter in the badger. See BADGER and CIVET.

ZIBETHUM, *civet*. See CIVET.

ZINC, or ZINK. See the article ZINK.

ZINGIBER, or ZINZIBER, *ginger*, in botany and pharmacy, *&c.* See the article ZINZIBER and GINGER.

ZINK, or ZINC, or ZINCK, in natural hiſtory, the name of a very remarkable foſſile ſubſtance, reſembling biſmuth in appearance, but of a bluer colour. See the article BISMUTH.

It is a very remarkable mineral, and one that has never been well underſtood as to its origin, till of late; for though the world well knew of a long time both zink and lapis calaminaris, and knew that both of them had the remarkable property of turning copper into braſs, which one would think might have given a hint to the diſcovery of a natural alliance between them; yet have they been ever treated of as two different ſubſtances, by the writers on theſe ſubjects; and Dr. Lawſon was the firſt who ever publicly declared, and proved, lapis calaminaris to be the ore of zink. See the article CALAMINARIS *Lapis*.

Zink is generally confounded with biſmuth, though in reality a very different body; but the regulus of theſe two minerals having a very great external reſemblance, the vulgar have not diſtinguiſhed them; and hence we hear of many ores of zink in the leſs accurate writers, all which are truly the ores of biſmuth.

The lapis calaminaris is the true and general ore of zink, yet that mineral is not confined to this ore alone, but is mixed in great abundance in its diſſeminated particles among the matter of the ores of other metals, particularly of lead.

Our artificers have long been acquainted with zink, under the name of ſpelter; but none of them till of late have ever been able to make any gueſs as to its origin. We have much zink brought to us from the Eaſt-Indies, under the name of tutenag; yet no body ever knew from what, or how it was produced there; and all that was heretofore known of it was, that among that ſtrange mixture of ores which the great mine yields at Goſſelaer in Saxony, when they were fuſed for other metals, a large quantity of zink was produced; but Dr. Lawſon obſerving, that the flowers of zink and of lapis calaminaris were the ſame, and that their effects on copper were the ſame, never ceaſed his inquiries till he found the method of ſeparating zink from it.

The pure zink is a ſolid metal-like body, of a bluiſh white, and ſomewhat leſs brittle than biſmuth, eſpecially when gently heated, and moſt, of all the metallic minerals, approaches to malleability: it melts in a very ſmall fire, and in a ſtrong one takes fire, burning with a bluiſh-green flame, and ſubliming into white flowers, which are with difficulty reducible again into the form of zink: in an open fierce fire, it wholly flies off in vapour.

There is great reaſon to believe, that all the zink or tutenag brought from the Eaſt-Indies, is procured from calamine; and we have now on foot at home, a work eſtabliſhed by the diſcoverer of this ore, which will probably make it very ſoon unneceſſary to bring any zink into England, as we have great plenty of the calamine.

The manner of extracting zink from the lapis calaminaris, is this: the lapis calaminaris muſt be finely pulverized, and well mixed with an eighth part of charcoal-duſt, and put into a cloſe retort to prevent the acceſs of the air, which would

would inflame the zink as it rifes. The retort is to be placed on a violent fire, fufficient to melt copper. After fome time the zink rifes, and appears in the form of metallic drops within the neck of the retort. When the veffel is cool, it muft be taken out, by breaking off the neck of the retort.

Flowers of ZINK. The flowers of zink are a fubftance famous in the writings of the chemifts, who have led their followers into a thoufand errors by the names by which they have called them.

Some have called them talc, and a folution of them in vinegar, oil of talc; to which they have attributed very extraordinary qualities. Some have fet the ignorant upon a fruitlefs attempt of extracting an oil from venetian talc, to do all the things they have commemorated of this oil. Others have called thefe flowers the fericum: others the aqua ficca philofophorum; and others the philofophic cotton.

The moft fimple and eafy way of obtaining the flowers of zink pure and white, is this: melt the zink in a tall crucible inclined in the furnace in an angle of 45 degrees, or thereabouts; let the fire be moderate, little ftronger than would be neceffary for the melting of lead. If the zink is left in this ftate without being ftirred, it forms a grey cruft upon its furface, and becomes calcined by degrees under it into a granulofe white fubftance; but to have the flowers, the matter muft be ftirred from time to time with an iron rod, and this cruft broken as often as it arifes; there will then, after fome time, appear a bright white flame, and about two inches above it there will be found a very thick fmoak, and with this there will arife a quantity of very white flowers, which will fix themfelves to the fides of the crucible in the form of fine cotton.

Thefe flowers are to be feparated at times, and by careful management there may be collected from the zink a greater weight of flowers than its own weight, when put into the fire. In working four pounds of zink in this manner, there will be only about an ounce of a calcined earthy matter left at the bottom of the crucible, and the quantity of flowers will be about two drams and a half in each pound, more than the quantity of zink; befide that, it is eafy to conceive from the manner of making them, that a great quantity muft have been carried away with the fmoak. And this is not to be prevented, fince if the veffel be clofed to keep in the fumes, the external air being denied free acceſs, the fublimation immediately ceafes, and no more flowers can be obtained, till the veffel is again opened, and the air admitted.

The fumes of zink have a ftrong fmell of garlic, and are very noxious to the lungs. The reducing zink into thefe flowers, is the deftroying it abfolutely as to its metallic form; for none of the methods ufed by chemifts to bring back metals to their original ftate, are able to bring thefe flowers to zink again.

ZINZIBER, or ZINGIBER, GINGER, in botany, the naked ftalked oval fpiked amomum. See the articles AMOMUM and GINGER.

ZIRICKSEE, a port-town of the united Netherlands, in the province of Zealand, fituated on the fouth fide of the ifland of Schowen, fifteen miles north-eaft of Middleburg.

ZITTAU, a town of Germany, in the circle of upper Saxony, and marquifate of Lufatia, fituated on the river Niefs, fifty-five miles eaft of Dreſden.

ZIZANIA, in botany, a genus of the *monoecia hexandria* claſs of plants; the male corolla whereof is a glume formed of two valves; the female corolla is a glume formed of a fingle valve, of a cuculated form, and terminated by an ariſta or awn; there is no calyx in either the male or female flowers; the feed is fingle, and placed in the bottom of the corolla, which opens horizontally to let it out.

ZIZIPHORA, the AMETHYSTEA, in botany, a genus of the *diandria-monogynia* claſs of plants, the corolla whereof is formed of a fingle ringent petal; the tube is cylindric, and of the length of the cup; the limb is very fmooth, the upper lip is ovated, erect, emarginated, and obtufe, the lower lip is broad and patent, and is divided into three equal rounded fegments; there is no pericarpium, but the cup contains four feeds which are oblong and obtufe, gibbous on one fide, and angular on the other.

ZIZIPHUS, in botany, a name whereby fome authors call the rhamnus. See the article RHAMNUS.

ZOCCO, ZOCCOLO, ZOCLE, or SOCLE, in architecture, a kind of ftand or pedeſtal,

deſtal, being a low ſquare piece, or member, ſerving to ſupport a buſto, ſtatue, pedeſtal, or the like thing that needs to be raiſed. See the article SOCLE.

ZODIAC, *zodiacus*, in aſtronomy, a faſcia or broad circle, whoſe middle is the ecliptic, and its extremes two circles, parallel thereto, at ſuch a diſtance from it, as to bound or comprehend the excurſions of the ſun and planets. See ECLIPTIC, EARTH, PLANET and SUN.

The ſun never deviates from the middle of the zodiac, *i. e.* from the ecliptic, but the planets all do more or leſs. Their greateſt deviations, called latitudes, are the meaſure of the breadth of the zodiac, which is broader or narrower, as the greateſt latitude of the planets is made more or leſs; accordingly ſome make it ſixteen, ſome eighteen, and ſome twenty degrees broad. See LATITUDE.

The zodiac, cutting the equator obliquely, makes an angle therewith, of 23° and a half, or more preciſely of 23° 29′, which is what we call the obliquity of the zodiac, and is the ſun's greateſt declination. See the articles OBLIQUITY and DECLINATION.

The zodiac is divided into twelve portions, called ſigns, and thoſe diviſions or ſigns are denominated from the conſtellations which antiently poſſeſſed each part; but the zodiac being immoveable, and the ſtars having a motion from weſt to eaſt, thoſe conſtellations no longer correſpond to their proper ſigns, whence ariſes what we call the preceſſion of the equinoxes. See the articles SIGN, CONSTELLATION, and PRECESSION.

When a ſtar therefore is ſaid to be in ſuch a ſign of the zodiac, it is not to be underſtood of that ſign or conſtellation of the firmament, but only of that twelfth part of the zodiac, or dodecatemory thereof. See the article STAR and DODECATEMORY.

Caſſini has alſo obſerved a track in the heavens, within whoſe bounds moſt of the comets, though not all of them, are obſerved to keep, which for this reaſon he calls the zodiac of the comets. See the article COMET.

This he makes as broad as the other zodiac, and marks it with ſigns and conſtellations like that, as Antinous, Pegaſus, Andromeda, Taurus, Orion, the leſſer Dog, Hydra, the Centaur, Scorpion, and Sagittary.

ZOLLERN, or HOENZOLLERN, a city of Germany, in the circle of Swabia, capital of the county of Zollern, and ſubject to its count, ſituated eaſt long. 8° 55′, north lat. 48° 18′.

ZOLNOCK, a town of upper Hungary, ſituated on the river Teyeſſe, fifty-five miles eaſt of Buda.

ZONE, Ζωνη, in geography and aſtronomy, a diviſion of the terraqueous globe, with reſpect to the different degree of heat found in the different parts thereof. See EARTH and HEAT.

A zone is the fifth part of the ſurface of the earth, contained between two parallels. See PARALLEL.

The zones are denominated torrid, frigid and temperate.

The torrid zone is a faſcia, or band ſurrounding the terraqueous globe, and terminated by the two tropics. Its breadth is 46° 58′. The equator, running thro' the middle of it, divides it into two equal parts, each containing 23° 29′. The antients imagined the torrid zone uninhabitable. See TROPIC and TORRID.

The temperate zones are two faſciæ, or bands, environing the globe, and contained between the tropics and the polar circles, the breadth of each is 43° 2′. See the article TEMPERATE.

The frigid zones are ſegments of the ſurface of the earth, terminated, one by the antarctic, and the other by the artic circle. The breadth of each is 46° 58′. See ARCTIC and ANTARCTIC.

ZONNAR, a kind of belt, or girdle of black leather, which the Chriſtians and Jews of the Levant, particularly thoſe in Aſia, and the territories of the grand ſeignior, are obliged to wear to diſtinguiſh them from the mahometans.

ZOOLOGY, Ζωολογια, the ſcience of animals. Artedi obſerves, that this makes one of the three kingdoms, as they are called, of natural hiſtory; the vegetable and the mineral being the two others: in theſe, however, there is this difference made by writers, that while vegetables and minerals are treated of together, as all of a piece in each, the ſubjects of zoology are divided; and it is made to compoſe, as it were, ſeveral kingdoms. Whoever is to write on plants and minerals, calls his work a treatiſe of botany, or mineralogy; and we have no words to expreſs any ſubdiviſion of them into kingdoms: but, in zoology, we treat as different ſubjects, the different parts of

of it; and the hiſtory of birds is ſeparated by ſome from the reſt under the name of ornithology; that of quadrupeds under the name of tetrapodology; and we have for the reſt, the words entomology, amphibiology, and the like, expreſſing theſe things which are properly but the parts of zoology, as ſo many diſtinct and ſeparate ſtudies. See the articles BOTANY and MINERALOGY.

The ſame author obſerves, that this may eaſily be amended, by our conſidering the animal world as we do the vegetable and mineral, and dividing it, as we do the others, into its proper families; it will then be found that theſe are no better diſtinctions than thoſe of the families of theſe things, and that the authors may as well ſet up ſeparate ſtudies under the names of bulbology, umbelliferology, and the like, as thoſe.

A natural diviſion of the ſubjects of zoology, on this principle, will afford ſix ſeveral families of its ſubjects. 1. The hairy quadrupeds. 2. The birds. 3. The amphibious animals, ſuch as ſerpents, lizards, frogs, and tortoiſes. 4. The fiſhes. 5. The inſects. And ſixthly, thoſe loweſt order of animated beings the zoophytes. See the articles QUADRUPED, BIRD, FISH, ORNITHOLOGY, ICHTHYOLOGY, *&c.*

ZOOPHORIC, or ZOOPHORIC COLUMN, is a ſtatuary column, or a column that bears and ſupports the figure of an animal. See COLUMN.

ZOOPHORUS, or ZOPHORUS, in the antient architecture, the ſame thing with frieze in the modern. See the article FRIEZE.

ZOOPHYTON, or ZOOPHITE, in natural hiſtory, a kind of intermediate body, partaking both of the nature of a ſenſitive, and a vegetable. See the article SENSITIVE *Plant*.

ZOOTOMY, the art of diſſecting animals, or living creatures, being the ſame with anatomy, or rather comparative anatomy. See the articles DISSECTION and ANATOMY.

ZOPISSA, *naval pitch*, a kind of mixture of pitch and tar, ſcraped off ſhips that have been a long time at ſea.

This matter by being gradually penetrated by the ſalt of the ſea, becomes partaker of its qualities, and being applied to the body externally, is found to be reſolutive and deſiccative.

ZUG, one of the cantons of Switzerland, is ſurrounded by the cantons of Lucern, Zurich and Switz, and is eighteen miles miles long, and ſeven broad.

ZUINGLIANS, a branch of the antient chriſtian reformers, or proteſtants, ſo called, from their author Huldric Zuinglius, a divine of Switzerland, who ſoon after Luther had declared againſt the church of Rome; and being then miniſter of the church at Zurich, fell in with him, and preached openly againſt indulgences, the maſs, the celibacy of the clergy, *&c.* What he differed from Luther in, concerned the euchariſt: for interpreting *hoc eſt corpus meum*, by *hoc ſignificat corpus meum*, he maintained, that the bread and wine were only ſignifications of the body and blood of Jeſus Chriſt; whereas Luther held a conſubſtantiation. As to the matter of grace, Zuinglius ſeemed inclined to Pelagianiſm, in which he differed from Calvin.

ZURICH, a canton of Switzerland, bounded by the canton of Schaffhauſen, on the north; by the canton of Appenzel on the eaſt; by Zug and Switz on the ſouth; and by Bern and Lucern on the weſt, being fifty miles long, and forty broad. Zurich is alſo the name of the capital city of this canton, ſituated eaſt long. 8° 30′, and north lat. 47° 52′. It is likewiſe the name of a lake, twenty-four miles long, and three broad; at the ſouth end of which the city of Zurich ſtands.

ZUTPHEN, a city of a county of the ſame name, in Gelderland, ſituated on the river Yſſel, ſixteen miles north-eaſt of Arnheim: eaſt long. 6°, north lat. 52° 15′.

ZUYDERSEE, a great bay of the german Ocean, which lies in the middle of the United Provinces, having the iſlands of Texel, Flie, and Schelling, at the entrance of it, on the north; the provinces of Friezland, Overyſſel and Gelderland on the eaſt; Utrecht, and part of Holland on the ſouth; and another part of Holland on the weſt. The chief town is Amſterdam.

ZWEIBRUGGEN, a county of the palatinate of the Rhine, in Germany, ſubject to the duke of Deuxponts.

ZWICKOW, a town of the circle of upper Saxony, and territory of Voightland, ſituated on the river Muldaw, forty-ſix miles ſouth-weſt of Dreſden.

ZWINGENBURG, or SWINGENBURG, a town of Germany, in the circle of the upper Rhine, and land of Heſſe Darmſtat, twelve miles north-eaſt of Worms.

ZYGÆ-

ZYGÆNA, or BALLANCE-FISH, in ichthyology, a ſpecies of ſqualus, with a very broad tranſverſe hammer-like head. See the article SQUALUS.

This is one of the moſt extraordinary fiſh in the world; in its form the general ſize is five or ſix feet, but it grows to be much larger; the head is the moſt extraordinary figure of that of any fiſh. It is not oblong, and running in a line with that of the body, but is placed tranſverſely, and has the appearance of the head of a hammer faſtened to its handle; the eyes are large, and placed at the two extremities; the mouth is a tranſverſe cut on the lower part of the head, and furniſhed with three or four rows of ſharp teeth; the noſtrils are ſmall and not very conſpicuous, and the foramina at the eyes are oblong and large; the body is oblong and moderately thick; there are two back fins, and a pinna ani; the apertures of the gills are ten oblong ſlits, five on each ſide, running from juſt below the head towards the roots of the pectoral fins; the tail is divided into two parts, and the upper of theſe is much longer than the under. See plate CCCII. fig. 5.

ZYGOMA, in anatomy, a bone of the head, otherwiſe called os jugale, being no ſingle bone, but an union or aſſemblage of two proceſſes, or eminences of bones; the one from the os temporis, the other from the os malæ; theſe proceſſes are hence termed the zygomatic proceſſes, and the ſuture that joins them together, is denominated the zygomatic ſuture. See the articles PETROSA and SUTURE.

ZYGOMATICUS, in anatomy, a muſcle of the head, ariſing from the os zygoma, whence its name, and terminating at the angle of the lips. This muſcle, though uſually ſingle, is ſometimes double throughout; at other times it has a double head; ſometimes its tail only is bifid, and it is variouſly interwoven with the adjoining ones. See the preceding article.

ZYGOPHYLLUM, *bean-capers*, in botany, a genus of the *decandria-monogynia* claſs of plants, the corolla whereof is compoſed of five petals broadeſt at the top; obtuſe, emarginated and larger than the cup; the nectarium conſiſts of ten convergent leaves, and includes the germen; the fruit is an oval pentagonal capſule, formed of five valves, containing five cells, with ſepta adhering to the valves; the ſeeds are numerous, roundiſh, and compreſſed; the figure of the fruit is ſubject to variation, and there is a ſpecies in which the parts of fructification are a fifth leſs. This genus comprehends the fabago of Tournefort.

ZYMOLOGY, in chemiſtry, is a term uſed by ſome writers, to expreſs a treatiſe on fermentation, or the doctrine of fermentation in general. And,

ZYMOSIMETER is an inſtrument propoſed by Swammerdam, wherewith to meaſure the degree of fermentation occaſioned by the mixture of different matters, and the degree of heat which thoſe matters acquire in fermenting; as alſo the heat or temperament of the blood of animals. See the articles FERMENTATION, HEAT, *&c.*

ZYTHOGALA, *beer-poſſet*, a drink recommended by Sydenham, as good to be taken after a vomit, for allaying the acrimonious and diſagreeable taſte the vomit has occaſioned, as well as to prevent gripes.

ARTI-

ARTICLES OMITTED;

AND

OTHERS (marked *Dict.*) further explained, or improved.

ACC

ABRUCKBANIA, or ABROBANIA, a town of Tranſilvania, ſituated on the river Ompay, near Clauſenburg.

ACALYPHA, in botany, a genus of the *monoecia polyandria* claſs of plants; the calyx of the male flowers conſiſts of four, ſmall, roundiſh, concave, and equal petals; there is no corolla: in the female flower the calyx is compoſed of three leaves, and there is no corolla; the fruit is a roundiſh, triſulcated, trilocular capſule, with a large, ſingle, roundiſh ſeed in each cell.

ACCELERATING FORCE, being the ſecond ſort of centripetal force, is expreſſed by that velocity, generated in a given time, with which bodies (conſidered as phyſical points) move towards the central body attracting them by its abſolute force. This accelerating force is greater or leſs, according to the diſtance of the center of the force, in a reciprocal duplicate proportion.

Thus is the gravity, that makes bodies tend towards the center of the earth, greater in vallies than on the tops of high mountains; greater at the poles than at the equator, which is ſeventeen miles higher; and greater at the equator than at greater diſtances from the center of the earth; for the ſame body, which, near the ſurface of the earth, falls ſixteen feet in the firſt ſecond of its fall, would fall but four in the ſame time, if it began at the height of four thouſand miles from the ſurface of the earth, or two ſemidiameters diſtance from its center. At equal diſtances the accelerating force is the ſame every where, becauſe all bodies, large or ſmall, heavier or lighter, abſtracting from the reſiſtance of the air, are equally accelerated in their fall. See the articles FORCE, CENTRIPETAL FORCE, MOTION, GRAVITATION,

ADH

EARTH, ACCELERATION, and DESCENT.

ACHYRANTHES, or ACHYRACANTHA, in botany, a genus of the *pentandria-monogynia* claſs of plants, having no corolla; the calyx is a perianthium, compoſed of five lanceolated, acute, rigid, pungent, and permanent dry leaves; there is no pericarpium; the ſeed is ſingle, roundiſh, and compreſſed.

ACT. (*Dict.*) ACT *of Grace.* See the article GRACE.

ACTÆA, in botany, the name whereby Linnæus calls the chriſtophoriana of Tournefort. See CHRISTOPHORIANA.

ACTINIA, in the hiſtory of inſects, a genus of ſea-animals, of the order of the gymnarthria, naturally of a cylindric ſhape, but variable figure; the tentacula are very numerous, and are ranged in ſeveral ſeries about the mouth, which is placed at one of the extremities of the body; theſe are in a continual vibratory motion, and by that means draw ſmall animals into its mouth for food. The whole animal is equally thick in all parts, and about half an inch long; its tail is divided into three parts; or terminated, as it were, by three points: it is of a pale fleſh colour, except the tentacula, which have a beautiful variety of colours, red, yellow, blue, and many others: it lodges itſelf in little cavities of rocks, and of the larger ſea-plants of the ſtony kind, and is found on the coaſts of the american iſlands.

There are a variety of ſpecies, differing from each other in figure, colour, *&c.* two whereof are repreſented plate V. fig. 6, n° 1 and 2.

ADHAL, or ADBIL, a town of India, ſituated near the mouth of the river Indus, in the province of Tata.

ÆGILOPS, (*Dict.*) in botany, a genus of the *polygamia-monoecia* class of plants; the corolla of the hermaphrodite flower consists of a bivalve glume, terminated by a double or triple arista or awn; the seed is single and oblong; the corolla of the male flower is also a bivalve aristated glume, as in the hermaphrodite flower.

ÆGOPODIUM, GOUT-WEED, in botany, a genus of the *pentandria-digynia* class of plants; the general corolla whereof is uniform; the single flowers consist each of five, oval, concave, and nearly equal petals; the fruit is naked, ovato-oblong, striated, and separable into two parts; the seeds are two, ovato-oblong and striated, convex on one side, and on the other.

This plant is commonly known in the shops under the name of angelica: for the medicinal vertues whereof, see the article ANGELICA.

ÆSCHYNOMENE, in botany, a genus of the *diadelphia-decandria* class of plants; the corolla whereof is papilionaceous; the fruit consists of a long compresso-plane, articulated, unilocular pod, containing a single kidney-shaped seed.

AGARIC, (*Dict.*) FEMALE AGARIC, the agaricus pedis equini facie of Tournefort, called from its being very easily inflammable, touchwood or spunk, is a fungus frequently met with on different kinds of trees in England, and has been sometimes brought into the shops mixed with the true agaric of the larch. From this it is easy distinguishable, by its greater weight, dusky colour, and mucilaginous taste, void of bitterness. The medullary part of this fungus, beat soft, and applied externally has been of late greatly celebrated as a styptic, and said to restrain not only venal, but arterial hæmorrhages, without the use of ligatures. See the articles STYPTIC and HÆMORRHAGE.

AIR, (*Dict.*) The air is generally esteemed a fluid, but yet differs from the general nature of fluids in three particulars; *viz.* 1. In that it is compressible, which property no other fluid has. 2. It cannot be congealed, nor any how fixed, as all other fluids may. 3. It is of a different density in every part, decreasing from the earth's surface upwards; whereas other fluids are of an uniform density throughout. The air is therefore a fluid *sui generis*, if it be properly any fluid at all. See the articles FLUID, COMPRESSION, CONDENSATION, CONDENSER, CONGELATION, DENSITY *of the air*, and ATMOSPHERE.

That the air was created at first with the earth itself is not to be doubted; and that ever since, there has been a constant generation of particles of air by the mutual action of bodies upon each other, as in fermentation, and all kinds of natural and artificial chemistry, sir Isaac Newton thinks very reasonable to suppose; and Mr. Boyle has given numerous experiments relating to the production of artificial or factitious air. See FERMENTATION, DISTILLATION, *&c.*

If we examine into the manner in which nature operates according to the laws which the great creator has ordained, we shall plainly discover that this air is the grand, efficacious, and necessary instrument which nature universally employs in almost all the operations she is perpetually engaged in. For in this, bodies of all kinds are placed; in this they move; and in this they perform all their actions, as well those which proceed from their particular and private natures, as those which depend upon their relation to other bodies. There is scarcely any liquid, as appears by experiment, which has not air intermixed with it; scarcely any solid out of which it may not be extracted by art. So that it is scarce possible to specify any operation of nature, which happens without the assistance of air, or utterly exclusive of it: the operations of fire, the loadstone, gravity, and the particular attraction and repulsion of corpuscles, may perhaps be alone excepted, as capable of being performed without it; to all others it is absolutely necessary. All the operations of chemistry, without any exception, are performed in the air.

It is very certain, that fire, which puts all things in motion, can neither be collected, preserved, directed, increased, or moderated, without air. Hence, then, if air is necessary to fire, air is also necessary to every operation of fire; so that without it, fire would cease to operate, nor could it be applied to other bodies. The fire here meant, is that which is excited and supported by inflammable fuel, by the means of which both art and nature execute their principal purposes.

Whoever has leisure and inclination to take a view of the more general classes of natural bodies, will find, that the air is every where required to their vitality,

growth,

growth, vigour, and action; for if their lives conſiſt in a circulation of humours through proper veſſels, and by a peculiar power converting the extraneous juices they receive into their own nature, or, at leaſt, by a ſingular virtue applying them to their ſubſtance, and thus increaſing in their magnitude, it ſeems utterly impoſſible that one of theſe functions can be performed without the perpetual aſſiſtance of air.

The weight or gravity of the air is proved by a great variety of curious experiments upon the air-pump; the principal of which are as follow. 1. By actually weighing it in a nice balance, where we ſhall ſee, that one gallon of air will weigh a dram very nearly. 2. By filling a glaſs tube with mercury, and inverting it in a baſon of the ſame fluid, where it will appear, that a column will be ſupported in the tube, by the ſole weight or preſſure of the air, to upwards of the height of twenty-eight inches. 3. By taking the air off the ſurface of the quickſilver in the gage of the air-pump, which then immediately riſes by the preſſure of the external air. 4. By exhauſting a receiver placed over the hole of the braſs plate on the pump, which will then be kept faſt by the preſſure of the incumbent air. Or, 5. More demonſtratively, by exhauſting a ſmall receiver under one larger, and letting in the air at once upon it, which will then be faſtened to the plate as before, though not placed over the hole. 6. By placing the hand on the open receiver, and exhauſting, the weight of the air on the hand, will be extremely ſenſible. 7. By placing a piece of thin glaſs or a bladder on the ſaid open receiver, which, when the air is a little exhauſted, will be broke into pieces by the weight of the incumbent air. 8. The air, exhauſted from a thin bottle under a receiver, and then ſuddenly let in, will, by its weight, inſtantly reduce it to very ſmall pieces. 9. By putting a piece of wood under quickſilver in the receiver, and then exhauſting the air, and letting it in again, it will, by its weight, force the quickſilver into the pores of the wood, and very ſenſibly increaſe its weight. 10. The exhauſted braſs hemiſpheres prove not only the prodigious weight of the air, but alſo the quantity thereof very exactly. 11. By exhauſting glaſs-bubbles, ſwimming in water, and letting the air in again, it will force the water into the bubbles, and make them ſink. 12. The ſyringe, with its weight deſcending in vacuo, and aſcending again upon the admiſſion of air, does very prettily prove the preſſure of the air, and the rationale of ſyringes in general. See the articles SYRINGE, GRAVITY, &c.

That water riſes in pumps, ſiphons, and all kinds of water engines, by the preſſure of the air only, is made evident by taking off the ſaid preſſure in the exhauſted receiver from a baſon of mercury, which then will not riſe in the pipe of the ſyringe on drawing up the piſton, as it will in the open air. See PUMP, SIPHON, FOUNTAIN, and ENGINE.

The ſpring or elaſticity of the air is alſo demonſtrable from various experiments of the like kind. 1. By the great expanſion of a ſmall quantity of air in an emptied bladder, when the air is taken off from the external parts in the receiver. 2. By the extruſion of a fluid out of a glaſs-bubble, by the expanſion of the bubble of air contained therein. 3. By the expulſion of the white and yolk of an egg through a ſmall hole in the little end, by the expanſion of the air contained in the great end, and alſo by raiſing up the ſkin of the egg, (after the yolk is taken away, and one half of the ſhell) by the expanſion of the ſaid included bubble of air, ſo as almoſt to fill the half ſhell. 4. Glaſs-bubbles and images, filled with water, ſo as to make them juſt ſink in water, will, upon exhauſting the air from the ſurface, riſe to the top of the veſſel. 5. Alſo a bladder, filled with air, and juſt made to ſink with a weight, will, upon exhauſtion, ſoon riſe by the expanſion of the contained air. 6. Beer, cyder, water, and porous bodies do emit great quantities of air under the exhauſted receiver. 7. Fiſhes are made ſo light or buoyant, by increaſing the ſpring of the air in their bladders, that they riſe to the top of the water, and cannot again deſcend to the bottom. 8. But that curious experiment, which ſhews the force of the ſpring of the air to be equal to its weight or preſſure, is by raiſing the mercury by the expanſion of a ſmall quantity of confined air to the ſame height in an exhauſted tube above the air-pump, as that which it is raiſed to in the mercurial gage by the preſſure of the atmoſphere below it.

The great action of animal life, *viz.* breathing, by inſpiration and expiration of air, is owing to the preſſure and ſpring of the air conjointly, as is evident by

the contraction and expanſion of a bladder in a ſmall receiver, with a bladder tied on at the bottom to repreſent the diaphragm. See RESPIRATION.

That air, paſſing through the fire and heated braſs tube, is unfit for animal reſpiration, is ſhewn by the ſudden death of any animal put into a receiver filled therewith. Alſo candles and live coals, put into this aduſt air, immediately go out. Hence the noxious and peſtilential qualities of damps and ſuffocating exhalations, ſo fatally experienced in mines and other ſubterranean places. See DAMP, EXHALATION, and MINE.

That the different velocities, with which heavy and light bodies deſcend in the air, is owing to the air's reſiſtance only, is manifeſt from the equal velocity or ſwiftneſs with which all bodies deſcend in the receiver, as is ſhewn in the experiment of a guinea and a feather. See DESCENT.

That fermentation, putrefaction, &c. depend on the air, and are promoted by it, is ſhewn by preſerving fruit in their natural bloom and perfection through the winter in an exhauſted glaſs. See FERMENTATION, PUTREFACTION, &c.

The uſe of the diving-bell depends upon the ſpring and force of the air; for ſince the ſpace, which the air takes up, is reciprocally as the power compreſſing it, it is evident, that, at the depth of thirty-three feet of water, where the preſſure of the atmoſphere is doubled, the bell will be half filled with water; at the depth of ſixty-ſix feet, it will be two-thirds filled; at the depth of ninety-nine feet, it will be three-fourths filled; and ſo on. See the article DIVING-BELL.

The ſpring of the air is moſt evidently concerned in that chirurgical operation, called cupping; for when a vacuum is made by a ſyringe in the cupping-glaſs applied to that part, the ſpring of the air in the fleſh under the glaſs does ſtrongly act, and by that means cauſes the fleſh to diſtend and ſwell into the glaſs, while the preſſure of the air, on the parts without the glaſs, accelerates the motion of the blood and fluids towards the part where it is diminiſhed or taken off by the glaſs. See the article CUPPING.

From this account of the air, and its properties, many curious appearances may be underſtood.

1. Air, as a fluid body, is the vehicle of the effluvia of all odorous bodies to the organs of ſmelling; and, as a ponderous fluid, it preſſes them on the nerves of thoſe organs, with a force ſufficient to make them ſenſible. It alſo impreſſes ſapid ſubſtances upon the organs of taſte, and renders them obſervable by the ſenſes. It is alſo the inſtrument of ſound; for the undulations, cauſed in it by bodies moved by various directions, ſtrike upon the external ear, which, by a ſingular mechaniſm, communicates this notice to the nerves expanded upon the internal ear. This weight of the air alſo, by preſſing upon the ſurface of animals and vegetables, prevents a rupture of their veſſels, from the force neceſſary to circulate their juices, to which it is, as it were, a counter-balance. All theſe things are evident, becauſe, on the tops of high mountains, where the air is very rare, the ſenſes of ſmelling, taſting, and hearing are very languid. On the tops of mountains alſo the blood-veſſels are very ſubject to burſt, whence frequent hæmorrhages happen to thoſe who travel to their ſummits. See the articles SMELLING, TASTING, HEARING, &c.

2. The air, by its elaſticity, contributes greatly to the ſolution of the aliment in the ſtomachs of animals. For, when that which is contained in every part of the food is rarified and expanded by the heat it meets with in the ſtomach, it deſtroys the coheſion of the component particles, and aſſiſts in reducing it to a ſtate of fluidity. At the ſame time, as it is confined in the ſtomach, all its action muſt be determined to the aliment, which it muſt therefore act upon with great force in this rarified ſtate. See STOMACH, RAREFACTION, DIGESTION, &c.

3. Reſpiration, ſo neceſſary to the continuance of the animal life, is performed by means of the air. For, when the air is expelled out of the lungs, the pulmonary veſſels, through which the blood circulates from the right ventricle of the heart, and by which it is returned to the left auricle, collapſe, and are no longer pervious, till the air, ruſhing into the branches of the aſpera arteria upon the elevation of the breaſt, diſtends the lungs, and thereby opens not only the air-veſſels, but alſo the branches of the pulmonary vein and artery, which accompany every where thoſe of the aſpera arteria. Here the air, as a heavy fluid, acts upon, compreſſes, and comminutes the blood; and, as it is elaſtic, and dilatable by heat, the action of it upon the blood in the lungs is, by this property, rendered greater. See RESPIRATION, CIRCULATION, &c.

4. If

4. If we conſider the air in all lights, we ſhall find, that every alteration it undergoes muſt induce ſome great change on the animal machine. Thus when it is very heavy, it muſt preſs upon the ſurface of our bodies, and the internal part of the lungs, with a greater force than when it is light. It has been proved by curious obſervations, that the difference of weight, with which our bodies are preſſed by the atmoſphere, in the greateſt degree of its natural gravity, from that which we ſuſtain when it is lighteſt, amounts to 398 ½ pounds troy-weight. Now as this difference is very great, the effects of it muſt alſo be conſiderable. See the article ATMOSPHERE.

5. The different degrees of heat and elaſticity in the air muſt have effects proportionable to the cauſes upon the bodies of animals. The various contents alſo of the air muſt of courſe induce great changes, as it ſome way or other finds means to communicate the qualities it borrows from them to the blood and juices of animals. Hence it becomes the vehicle of contagion, and the propagator of diſeaſes, both epidemical and endemial, which admit of infinite variety, becauſe the alterations of the air, with reſpect to its properties, and to the innumerable combinations of bodies contained in it, are infinite. However, we may venture to conclude, that the moſt healthful is that which is ſerene and dry, and conſequently ponderous, and replete with the acid vital ſpirit.

6. It is the phyſical office and uſe of the air, to aſſiſt in raiſing the vapours and exhalations of the earth, and to ſerve as a general matrix for them; wherein they are all blended together, and fermented, or ſome way changed in their nature, ſo as to perform new offices, or recruit the vegetable, animal, and mineral kingdoms, when ſuch enriched vapours fall back again in rain or dew to the earth. See VAPOUR, RAIN, and DEW.

7. Hence may be conceived in general how all the changes and phænomena, as meteors, exploſions, thunder, lightning, the aurora borealis, &c. happen in this great chaos of the atmoſphere, *viz.* according as floating particles of different kinds chance to meet, ſo as to form conſiderable aggregates or collections; and according as they are favoured by the requiſite degrees of heat, cold, dryneſs, or moiſture. See the articles METEOR, EXPLOSION, THUNDER, &c.

The various degrees of the heat and cold in the air is indicated by the thermometer: its different weight, by the barometer; and its moiſture and dryneſs is ſhewn by the hygrometer. See the articles THERMOMETER, BAROMETER, and HYGROMETER.

Having conſidered the properties of the air, it is neceſſary to conſider alſo what corpuſcles are blended and contained in this heterogeneous fluid. And theſe are in reality almoſt infinite, of various natures, and entirely different in different parts of the atmoſphere. We may therefore conſider it as an univerſal chaos, in which corpuſcles of almoſt every kind, being confounded together, make up a compoſition conſiſting of the moſt different parts. For, 1. There is always, and every where, fire contained in the common air. See the article FIRE.

2. There is water contained always in the air, and in every part of it, and that in ſuch a manner, that it does not appear poſſible, by any known methods, to ſeparate the water entirely from it. Water is every moment perſpiring from every perſon in health, in an inviſible vapour. Sanctorius computes, that, in twenty-four hours time, there exhales from ſuch a perſon nearly the weight of five pounds, much the greateſt part of which is water. A vaſt quantity of aqueous ſteams muſt therefore be continually exhaling from animals of all kinds ſcattered all over the earth; and that all plants likewiſe ſend forth a dewy aqueous vapour, is a thing which has been long confirmed by obſervations; but the learned and induſtrious Dr. Hales has, in his curious treatiſe of vegetable ſtatics, reduced the vaſt quantity of aqueous vapours exhaling from plants to calculation. Dr. Halley, from obſervations made with the greateſt care and accuracy, has made it appear, that from the ſurface of the Mediterranean alone, in one ſummer's day, there exhales, by the heat of the ſeaſon only, without any aſſiſtance from the wind, 52,800,000,000 tons of water. Hence the origin of ſprings and rivers. See the articles WATER, PERSPIRATION, SPRINGS, SEA, &c.

3. All the parts that we can obſerve in vegetables, are continually changing, and diſperſed throughout the atmoſphere. That the ſpirits of vegetables do always, and every where, exhale, and fill the air with a continual fragance, no body can diſpute. And it is very certain, that the odour

odour of plants, diſperſed through the vaſt tracks of air, often inform the mariners, before they diſcover land, of their approach to the ſhore. Hence then it follows, that whatever odoriferous ſpirits are at any time by nature produced in plants, all theſe are certainly, at length, contained in the air alone. See the articles PLANT, ODOUR, *&c.*

4. If we enquire whether the parts of animals are contained alſo in the air, we ſhall find there is a great quantity of exhaling ſpirits; and thoſe wholly peculiar to every animal that are continually diſſipated and carried into the air from living animals, and adhere to other bodies; and by means of theſe ſpirits it is, that dogs, which purſue by ſcent, diſtinguiſh ſo accurately the animals from which they exhale; and how full the air is frequently of effluvia, exhaling from animals, appears evident from the infection too often obſervable in contagious diſtempers.

5. Foſſils are likewiſe diſcoverable in the air; for all foſſile-ſalts, however fixed, at laſt fly off in the air, if they are diſſolved in water, (eſpecially in that which they attract from the air) and are afterwards digeſted for a long time in a putrifying heat, then diſtilled with a great degree of fire, their reſiduum calcined in a ſtrong open fire, and then diſſolved in the air again. Do not the chemiſts convert, by different methods, many thouſand pounds weight of ſuch ſalt into acid volatile fumes, which they call ſpirit? And does not every ſuch chemical operation infect the very air? With regard to the principles, which are termed ſulphurs, theſe, whenever the foſſils are burnt, are entirely carried into the air, and, being intermixed with it, diſappear, the ſaline acid part changing into a ſuffocating fume, and the oleaginous part being attenuated by the action of the flame, and flying off in an inviſible or ſooty black vapour. It is very certain, that hardly any thing at all of theſe parts remains in the earth. Sulphur now itſelf, when alone, is carried into the air in form of an impalpable powder, and is there diſperſed about. See the articles FOSSILS, SULPHUR, *&c.*

6. Metals themſelves have been found to be ſo far changed, that even thoſe, under a new form of a volatile fume, have been elevated and ſcattered in the air. This is univerſally known to be true of mercury, which, agitated only by a fire of 600 degrees, flies off, and becomes inviſible. And if the air, impregnated with it, ſurrounds, and is applied to a human body, how wonderfully does it penetrate it, and how quickly does it raiſe a ſalivation! But beſides, while it thus flies off, it carries up and bears away with it ſome part of certain metals; as appears from the diſtillation of lead and tin with mercury. See METALS, MERCURY, *&c.*

AIR-PUMP. (*Dict.*) *Smeaton's* AIR-PUMP. See the article PUMP.

AIRA, in botany, a genus of the *triandria digynia* claſs of plants, the corolla whereof is compoſed of two valves, extremely reſembling thoſe of the cup; one of theſe often produces an ariſta, near twice as long as the flower; the corolla ſerves the office of a pericarpium, and incloſes the ſeed, which is ſingle, and of an oval figure.

There are ſome ſpecies of this genus, in which male flowers are mixed with the hermaphrodite ones under the ſame common cup: in this caſe, the male flower produces an ariſta, whereas the female does not.

AKANIS, or ACANES, the name of a kingdom and town of Guinea, ſituated on the golden coaſt.

ALCHIMILLA, in botany. See plate XII. fig. 2.

ALCOHOL, (*Dict.*) ALCOHOL *martis*, filings of ſteel reduced to an impalpable powder, by turning it into ruſt with urine, then levigating it, and mixing it with a large quantity of water, that is, about a gallon, to two pounds and a half of filings. After it has ſtood a quarter of an hour, the upper part of the water is to be poured off, and evaporated to a dryneſs. The powder at the bottom is to be put into a paper, in the form of a ſugar-loaf, and waſhed, by gradually pouring in hot water, till it is freed from the urinous ſalts: with regard to the remaining groſs powder, the ſame proceſs is to be repeated over again.

To bring the gout back from the noble parts to the joints, Mulgrave has a great opinion of this remedy: he preſcribes it thus; take of alcohol martis from five to ten grains, theriaca andromachi from half a ſcruple to one dram, mix theſe with as much ſyrup of clove-july-floweras is ſufficient to make a bolus. See GOUT.

ALDERAIMIN, in aſtronomy, a ſtar of the third magnitude, on the right ſhoulder of cepheus. See CEPHEUS.

ALMANAC. (*Dict.*) For the duties upon almanacs, ſee STAMP-DUTIES.

ALPINIA,

ALPINIA, in botany, a genus of the *monandria-monogynia* claſs of plants, the corolla whereof is monopetalous, unequal, and as it were double; the exterior one is trifid, the upper ſegment is hollow, the two ſide ones flat, and it has a tube; the interior is ſhort, its edge is trifid, and the lower ſegment of the three hangs out beyond the lateral parts of the exterior corolla, the other two are emarginated, and the baſe is ventricoſe; the fruit is a fleſhy capſule, of an ovated figure, compoſed of three valves, and containing three cells; the ſeeds are numerous, of an ovated figure, with a prominent but truncated apex, and a caudated baſe.

ALSINELLA, the name by which Dillenius calls the plant ſagina. See the article SAGINA.

AMARYLLIS, in botany, genus of the *hexandria-monogynia* claſs of plants, the corolla whereof conſiſts of ſix lanceolated petals; the fruit is an oval or nearly oval capſule, formed of three valves, and containing three cells; the ſeeds are numerous; the inflection of the petals, ſtamina and piſtil in this genus is very different in the various ſpecies.

This genus comprehends the lilio-narciſſus of Tournefort and Dillenius, and the Guernſey-lilly.

AMMODYTES, (*Dict.*) the SAND-EEL or GRIG. The characters of this genus of fiſhes are as follow: the body is oblong and ſlender, and is of a rounded but ſomewhat depreſſed figure; there are no belly-fins, the head is of a depreſſed form, and the branchioſtege membrane on each ſide contains ſeven bones, but they are in great part covered by the opercula of the gills. The head of the ammodytes is ſmall, much narrower than the body, of a compreſſed figure, and acute at the forepart; the lower jaw projects a great way beyond the upper, and the opening at the mouth is large; the noſtrils have each a double aperture, and ſtand in the middle between the eyes and the extremity of the roſtrum; the eyes are large, and the iris of a ſilvery colour; the ſcales are extremely ſmall on the back, and are of a greyiſh colour, and the belly is of a ſilvery-white.

AMMOSCHISTUM, in natural hiſtory, the name of a genus of foſſils, conſiſting of ſlate ſtone, compoſed only of ſparry and cryſtalline particles, or of talcy, ſparry and cryſtalline particles. See SLATE.

AMOMUM, (*Dict*) AMOMUM, in botany, a genus of the *monandria monogynia* claſs of plants, the corolla whereof is monopetalous, conſiſting of a ſhort tube, and a limb divided into three oblong ſegments, the middle ſegment is larger then the reſt, and the ſinus oppoſite to it more open; the nectarium is monophyllous, and inſerted into the large ſinus juſt mentioned; it ſcarce at all appears above the ſegments of the corolla; the fruit is coriaceous, of an oval figure, but ſomewhat three cornered, it is compoſed of three valves forming as many cells; the ſeeds are numerous and ſmall. The amomum comprehends the plant called zinziber by authors; for the uſes and characters whereof, ſee GINGER and ZINZIBER.

AMOS, or *the prophecy of* AMOS, a canonical book of the Old Teſtament. This prophet boldly remonſtrates againſt the crying ſins that prevailed among the Iſraelites, ſuch as idolatry, oppreſſion, wantonneſs and obſtinacy, and reproves the people of Judah for their carnal ſecurity, ſenſuality and injuſtice. He terrifies them both with frequent threatnings, and pronounces that their ſins will at laſt end in the ruin of Judah and Iſrael, which he illuſtrates by the viſions of a plumb line and a baſket of ſummer-fruits. He begins with denunciations of judgment and deſtruction againſt the enemies of the Jews, and concludes with promiſes of reſtoring the tabernacle of David, and erecting the kingdom of Chriſt.

ANABLATUM. or SQUAMARIA, in botany. See SQUAMARIA.

ANACYCLUS, in botany, a genus of plants of the *ſyngeneſia-polygamia-ſuperflua* of Linnæus, being the ſame with the ſantolinoides of other authors. See the article SANTOLINOIDES.

ANALEMMA, (*Dict.*) ANALEMMA in geometry. See *Orthographic projection of* MAPS *on the plane of the meridian*.

ANATOMY (*Dict.*) With regard to the antiquity of anatomy, it ſeems ſcarcely poſſible, but that the ſlaughter of beaſts for the uſe of man, caſualties, murders, and the accidents of war, muſt have furniſhed mankind with a general knowledge of the ſtructure of the parts, in very early ages of the world. But it is not very certain at what period it began to be cultivated as a ſcience. This, however, muſt have been very early, eſpecially if we pay any regard to Manetho, the famous Egyptian writer, who, according to Euſebius, relates, that Athotis, an Egyptian king, wrote ſome treatiſes of

anatomy.

anatomy. This king, if the Egyptian chronology was to be depended upon, lived many ages before Adam. This, however, falſe with regard to time, tends to prove the great antiquity of the ſcience. However this be, it is certain that before, or, at leaſt, in the days of Homer, anatomy was much cultivated, ſince this author appears to have had a competent knowledge of the parts, and to have been well verſed in the renunciation of wounds, ſo as to give an accurate account of their effects in almoſt all parts of the body. But Hippocrates is the firſt author, at leaſt extant, who treated of anatomy ſcientifically. This great writer, conſcious of his noble and exalted genius, publiſhed many anatomical obſervations, which, though disjointed, and ſcattered here and there in his works, yet make up almoſt an entire body of anatomy, when collected together. He was followed by Democritus, Empedocles, Alcmæon of Crotona, Ariſtotle, Galen, &c. Anatomy however made but ſlow, and almoſt imperceptible advances towards perfection, till the time of Andreas Veſalius, who was born at Bruſſels in the year 1514. His ſuperior genius, in conjunction with his indefatigable application and induſtry, ſoon raiſed him to ſuch a pitch of anatomical knowledge, as rendered him at once the ornament of his own, and the admiration of future ages. This accurate anatomiſt was followed by Stephanus, Vicary, Gemini, Sylvius, Servetus, Columbus, Fabricius, Riolanus, Libavius, &c. who all contributed to the improvement of anatomy. In 1622, Caſpar Aſellius, profeſſor of anatomy at Pavia, obſerved the lacteal veſſels in the meſentery, which he deſcribes as conveying the chyle to a large gland, ſeated in the center of the inteſtines. He however modeſtly declines the honour of this diſcovery, becauſe he ſays theſe lacteals were known to Hippocrates, Eraſiſtratus, and Galen. The celebrated Harvey, in the year 1628, publiſhed his diſcovery of the circulation of the blood, which was of the moſt importance to phyſic of any that was ever made, and acquired him an immortal name. Pecquet, in the year 1651, diſcovered the reſervoir of the chyle, and the thoracic duct. And Rudbecks and Bartholine in 1650, and 1651, diſcovered the lymphatic veſſels. Wharton, in 1655, diſcovered the lower ſalival ducts; and Steno the upper ſalival ducts, thoſe of the palate, noſtrils, and eyes, in 1661. Willis ſucceeded him, and publiſhed an accurate anatomy of the brain and nerves.

Anatomy is alſo greatly indebted to the accurate obſervations of Malpighius, who died in 1694. This great anatomiſt made a vaſt number of diſcoveries in the lungs, brain, liver, ſpleen, glands, lymphatics, &c. by the help of the microſcope. The celebrated Ruyſch has happily elucidated the finer and more intricate part of the human machine, by means of injections. Other more late writers upon anatomy are Maurice, Hoffman, Cowper, Ridley, Bartholine, Keill, How, Morgagni, Valſalva, Pacchionus, Drake, Vercellonius, Santorini, Cheſelden, Monro, Douglas, Heiſter, Winſlow, &c.

ANCLE (*Dict.*) ANCLE *luxated*, in ſurgery. The ancle is ſubject to be luxated, either in running, in jumping, or even in walking; and that in all four directions, either inward or outward, backward or forward. When the ancle is luxated inward, the bottom of the foot is turned outward; and on the contrary, when it is luxated outward, the bottom of the foot is turned inward, which latter caſe is indeed much more frequent than the others. If it is diſlocated forward, the heel becomes ſhorter, and the foot longer than it ſhould be; and if backward, the contrary ſigns to theſe will appear. The ancle however can ſcarce poſſibly be luxated outwards, unleſs the fibula be ſeparated from the tibia, or elſe quite broken, which may happen to the external ancle; nor is it at all uncommon for a luxation of the ancle to be attended with very grievous ſymptoms, eſpecially when occaſioned by ſome great external violence; nor can it indeed well happen otherwiſe in this caſe, ſince the diſtortion of the foot muſt neceſſarily overſtrain the adjacent tendons, ligaments, and nerves, and thence excite very violent pains, and other bad ſymptoms; or the veins and arteries may alſo be very eaſily lacerated, which will occaſion a large extravaſation of blood about the whole foot, which too often gives riſe to a gangrene. It is however neceſſary to obſerve, that the ancle is not always luxated, after it has been violently ſtrained by leaping or turning the foot on one ſide; for it ſometimes happens, that the ancle is not diſlocated on

theſe occaſions, but only the parts are violently contuſed and ſtrained. The ancle, when truly luxated, is more or leſs difficult to be reduced, according to the violence of the force by which the accident was occaſioned. The moſt ready way, however, of reducing a luxation of the ancle, according to Heiſter, is, to place the patient upon a bed, ſeat, or table, leting the leg and foot be extended in oppoſite directions by two aſſiſtants, while the ſurgeon replaces the bones with his hands and fingers in their proper ſituation. When the foot is by this means reſtored to its proper poſition, it is to be well bathed with oxycrate and ſalt, and then carefully bound up with a proper bandage. The patient muſt be enjoined to keep his bed for a conſiderable time, till the bad ſymptoms are gone, and the Ancle has recovered its ſtrength ſo far, as to bear the weight of the body, without any uneaſineſs or danger.

ANEMOMETER, (*Dict.*) for the deſcription, conſtruction and repreſentation, whereof, ſee *Velocity and force of the* WIND.

ANGELICA, (*Dict.*) in botany, Tournefort's name for the ægopodium of Linnæus. See the article ÆGOPODIUM.

ANGER, (*Dict.*) Mr. Hutcheſon, having defined anger, a propenſity to occaſion evil to another, ariſing upon apprehenſion of an injury done by him, obſerves, that this violent propenſity is attended generally, when the injury is not very ſudden, with ſorrow for the injury ſuſtained, or threatned, and deſire of repelling it, and making the author of it repent of his attempt, or repair the damage.

But beſides theſe conditions, which are good, in ſome ſort intended by men when they are calm, as well as during the paſſion, there is in the angry perſon a propenſity to occaſion miſery to the offender, a determination to violence, even where there is no intention of any good to be obtained or evil avoided by this violence. And it is principally this propenſity which we denote by the name anger, though other deſires often accompany it.

ANGLE, (*Dict.*) *Plain* ANGLE in geometry. See the article PLAIN.

ANONIS, REST-HARROW, (*Dict.*) in botany, Tournefort's name for the ononis of Linnæus; for the virtues, and a repreſentation whereof, ſee the article ONONIS, and plate XVIII. fig. 5.

ANOREXY, (*Dict.*) the cauſe and cure whereof, ſee under the article NAUSEA.

ANTHEMIS, in botany, the name whereby Linnæus calls the chamæmelum of Tournefort. See CHAMÆMILE.

This is alſo a name whereby ſome writers call the buphthalmum, or ox-eye. See BUPHTHALMUM.

ANTHYLLIS, the BLADDER LOTUS, in botany, a genus of the *diadelphia-decandria* claſs of plants, the corolla whereof is papilionaceous; the fruit is a ſmall roundiſh legume, compoſed of two valves, and containing one or two ſeeds. This genus comprehends the vulneraria of Tournefort and others.

ANVIL, (*Dict.*) in mechanics, for a repreſentation, *&c.* whereof, ſee plate CCLIII. fig. 2, and the article SMITHERY.

APLUSTRE, APLUSTRÆ, or AMPLUSTRÆ, in the naval architecture of the antients, an ornament reſembling a ſhield fixed in the poop of a ſhip, in which caſe it differed from the acroſtolium. See the article ACROSTOLIUM.

APPELLATIVE, (*Dict.*) See NAME and GENERAL TERMS.

APPROBATION, is defined by Mr. Hutcheſon, a ſtate or diſpoſition of the mind wherein we put a value upon, or become pleaſed with ſome perſon or thing.

Moraliſts are divided on the principle of approbation, or the motive which determines us to approve and diſapprove. The Epicureans will have it to be only ſelf-intereſt; according to them, that which determines any agent to approve his own action, is its apparent tendency to his private happineſs; and even the approbation of another's action flows from no other cauſe but an opinion of its tendency to the happineſs of the approver, either immediately or remotely. Others reſolve approbation into a moral ſenſe, or a principle of benevolence by which we are determined to approve every kind affection either in ourſelves or others, and all publickly uſeful actions, which we imagine to flow from ſuch affection, without any view therein to our own private happineſs.

ARÆOMETER, (*Dict.*) See the article HYDROMETER.

ARGONAUTIC EXPEDITION. See the article EPOCHA.

ARGUMENT, (*Dict.*) In reaſoning, Mr. Locke obſerves, that men ordinarily uſe four ſorts of arguments. The firſt

is to alledge the opinions of men, whoſe parts and learning, eminency, power, or ſome other cauſe, has gained a name, and ſettled their reputation in the common eſteem with ſome kind of authority; this may be called *argumentum ad verecundiam*. Secondly, another way is to require the adverſaries to admit what they alledge as a proof, or to aſſign a better; this he calls *argumentum ad ignorantiam*. A third way is, to preſs a man with conſequences, drawn from his own principles or conceſſions; this is known by the name of *argumentum ad hominem*. Fourthly, the uſing proofs drawn from any of the foundations of knowledge or probability; this he calls *argumentum ad judicium*; and obſerves, that it is the only one of all the four, that brings true inſtruction with it, and advances us in our way to knowledge. For, 1. It argues not another man's opinion to be right, becauſe I, out of reſpect, or any other conſideration, but that of conviction, will not contradict him. 2. It proves not another man to be in the right way, nor that I ought to take the ſame with him, becauſe I know not a better. 3. Nor does it follow, that another man is in the right way, becauſe he has ſhewn me, that I am in the wrong: this may diſpoſe me, perhaps, for the reception of truth, but helps me not to it; that muſt come from proofs and arguments, and light ariſing from the nature of things themſelves, not from my ſhamefacedneſs, ignorance or error. See REASON and REASONING.

ARGUMENT *of the moon's menſtrual longitude*, or *menſtrual* ARGUMENT *of the longitude*, is an arch of the excentric circle of the moon, intercepted between her true place, once equated, and a right line drawn through the center of the excentric parallel to the menſtrual line of the apſides. See APSIS and MOON.

ARM. (*Dict.*) For fractures and luxations of the arm, ſee the articles HUMERUS and CUBITUS.

ART. (*Dict.*) *Angelic* or *angelical* ART, or the art of ſpirits, is defined to be a method of attaining to the knowledge of any thing deſired, by means of angels, or rather of dæmons: under this come the arts of magic, ſorcery, witchcraft, *&c.* See the article MAGIC, *&c.*

ARTERY. (*Dict.*) In plate XXII. (*by miſtake numbered* XXI.) fig. 1.

3, 9. Point out the neighbouring muſcles of the temporal arteries, the hairy ſcalp, and forehead.

10, 10. Trunks which ſend blood to the foramina narium.

12, 12. Arteries which carry blood to the ſauces, gargareon, and muſcles of of thoſe parts.

14, 14. Thoſe parts of the carotids, where they paſs by each ſide of the ſella turcica, where divers ſmall branches ariſe from them, to compoſe the rete mirabile.

17, 17. The communicant branches between the carotid and cervical artery.

20, 20. Other arteries of the larynx, which convey the blood to the muſcles of the neck and ſcapula.

22, 22. The arteries of the muſcles of the os humeri, and ſome of thoſe of of the ſcapula.

30. A ſmall artery ſpringing from the fore-part of the aorta deſcendens, paſſing to the gula.

42. Two ſmall arteries going to the upper part of the duodenum and pancreas.

48. Thoſe of the rectum.

50. The vertebral arteries of the loins.

63. The penis diſtended with wind, and dried.

64. The glans penis.

65. The upper-part of the dorſum penis, cut from the body of the penis, and raiſed to the corpora cavernoſa penis.

66, 66. Corpora cavernoſa penis freed from the oſſa pubis, and tied after inflation.

67. The two arteries of the penis, as they appear injected with wax in each cavernous body of the penis.

68. The capſula and ſeptum of the corpora cavernoſa penis.

71. That part of the crural artery that paſſes the ham.

Wounds of the ARTERIES. When any conſiderable artery is wounded or divided, there generally enſues ſo violent an hæmorrhage, that the wounded party is in an inſtant ſenſible of a great weakneſs and a loſs of ſpirits, and faints away; and when any of the larger arteries are divided, whether they are external or internal, he dies upon the ſpot. Although ſomewhat leſs danger is apprehended from wounds that are inflicted upon the arteries, which are ſituated upon the external parts of the body, ſome few excepted, becauſe they will admit of the ligature, and other means for reſtraining the violence of the hæmorrhage; nevertheleſs, in the opinion of Heiſter, it is impoſſible

to

to prevent the limbs, which lie below the diviſion of the artery, and are uſed to receive their nouriſhment by that channel, from becoming paralytic; nay, ſometimes from mortifying: this is almoſt conſtantly the caſe, when the trunk of the brachial or crural artery is divided. See WOUND and HÆMORRHAGE.

Theſe being the conſequences which follow the total diviſion of a conſiderable artery, it now remains to conſider what will follow a partial diviſion of them. Whenever a large artery is wounded, and not entirely divided, the wounded fibres inſtantly contract themſelves; by this means they dilate the orifice of the wound, and render it difficult to ſtop the flux of the blood; and though the hæmorrhage be ſtopped for a little time, yet it will burſt out again on a ſudden violently, or, at leaſt, produce an aneuriſm: this will frequently be the caſe, when only the external coat of the artery is wounded; for by this means, the internal coat is left to ſuſtain the whole impetus of the pulſe, which it being unequal to, is forced by degrees into a tumour like a bag, which frequently brings on great miſchiefs. See TUMOUR and ANEURISM.

The various methods for ſtopping the profuſion of blood, attending injuries of the arteries, have been already treated of under the article hæmorrhage; but it may be here obſerved, that in dangerous wounds of the large arteries, ſuch as the crural and axillary, and in amputations of the limbs, the ſafeſt method is that of making a ligature round the veſſels: if this is performed by paſſing a ſtrong waxed thread under the artery, by the help of a crooked needle, the blood is preſently ſtopped, and the orifices of the artery coaleſce.

ARTHRONIA, in zoology, a name given by Dr. Hill to that claſs of animalcules, which have viſible limbs; ſuch as the ſcelaſius, brachionus or wheel-animals, *&c.* See the article SCELASIUS, *&c.*

ASCLEPIAS, (*Dict.*) or VINCETOXICUM, in botany; for the medicinal virtues whereof, ſee VINCETOXICUM.

ASPALATH, (*Dict.*) or RHODIAN WOOD. See RHODIUM LIGNUM.

ASSAYING. (*Dict.*) In order to the aſſaying of gold-ores, it muſt be obſerved, that the method varies according to the nature and diſpoſition of the mineral matters, along with which the metals happen to be mixed, whether it be ſtony, earthy, ſulphureous, arſenical, *&c.* The art of making aſſays with diſpatch upon gold and ſilver ores depends upon the ſcorification or vitrification of thoſe heterogeneous foſſile ſubſtances, which may be incorporated therewith: lead and the glaſs of lead, and antimony and its glaſs, being great ſcorificators or vitrifiers, they become the natural agents upon ſuch occaſions. See SCORIFICATION, VITRIFICATION, and QUARTATION.

The ultimate refinement of gold is thought to be that procured by fuſing it thin along with thrice its own weight of antimony, wherein the antimony tears away, and imbibes the ſubſtance of all the other metals, but leaves the gold untouched, which therefore, as the heavier body, falls like a regulus to the bottom of the melting cone. See the article ANTIMONY.

In caſe there is a ſmall or fine gold-ſand to aſſay, or a very rich and delicate ſlud, both the proof by a ſmall aſſay, and the extraction in the large way, are ſometimes effected by amalgamation. Thus a certain parcel of it being weighed out, it is mixed with a determinate proportion of mercury, eight or ten times its quantity, and a quantity either of ſimple or ſalt water poured warm to them in a ſtone-mortar; let them be ground togegether, for ſome time, with a wooden peſtle; then the ſand is dilated by the addition of a little more water, that the mercurial particles may firſt ſubſide, which being now connected into one maſs, the ſand, in a little baſon, is eaſily waſhed off; then the mercury, being ſqueezed through leather, the particles of gold, that were collected and imbibed by it, remain behind, mixed with about one third part of the mercury in the form of a ſoft maſs or amalgam, which being expoſed in a little glazed diſh to a gentle fire, the mercury is thus evaporated, and leaves the gold in powder, which may now be weighed, to ſhew in what proportion the ſandy or fluddy ore contains it. The like method of management will ſerve for the aſſaying of ſilver-ores. See AMALGAMATION and SILVER.

Accurate aſſays upon the ores of the inferior metals, as lead, tin, copper, and iron, require proper furnaces, the due applications of fire, and ſuitable fluxes adapted to the reſpective ores; and indeed ores of the ſame kind frequently require different methods of aſſaying, as well as ſmelting. See the articles FLUX, SMELTING, FURNACE, TIN, *&c.*

In order to the due ſeparation of metals from metals, or of a conſuſed mixture of metals, ſuch as thoſe commonly called electrums, or ſuch as the corinthian braſs of old was ſuppoſed to be, we muſt obſerve, that experience has taught us a certain effect of lead, which could not be well conceived *a priori*: this is more effectually and ſooner done by a proper glaſs of antimony, *viz.* that, by fuſion upon the coppel, it reſolves all the imperfect metals, without exception, into their ſmalleſt atoms, and partly throws them up into its furnace, in the form of a half vitrified powdery ſubſtance, in part ſinks along with them into the coppel, and in part converts them into glaſs, ſo as to leave nothing behind, but pure gold and ſilver.

ASSIGNMENT. (*Dict.*) *Novel* ASSIGNMENT. See NOVEL *Aſſignment*.

ASTROLABE. (*Dict.*) The aſtrolabe is otherwiſe called a planiſphere. See the article PLANISPHERE.

ATMOSPHERE. (*Dict.*) The reaſon why this body of air is ſo tranſparent, as to be inviſible, is owing to the great poroſity thereof; the pores and interſtices of air being ſo very great and large, it admits the light not only in right lines, but in ſuch great and plentiful rays, that the brightneſs and univerſal luſtre thereof not only renders the air diaphanous, but entirely hinders the opacity of the very ſmall particles of air from being at all ſeen; and therefore the whole body of air muſt conſequently be inviſible. See the article OPACITY.

Since the air, ſays ſir Iſaac Newton, is compreſſed by the weight of the incumbent atmoſphere, and the denſity of the air is proportionable to the force compreſſing it, it follows, by computation, that at the height of about 7 engliſh miles from the earth, the air is four times rarer than at the ſurface; and at the height of 14 miles, it is 16 times rarer than at the ſurface; and at the height of 21, 28, or 35 miles, it is reſpectively 64, 256, or 1024 times rarer; and at the height of 70, 140, and 210 miles, it is about 1000000, 1000000000000, or 1000000000000000000 times rarer; and ſo on in a geometrical proportion of rarity, compared with the arithmetical proportion of its height. See the article AIR.

The weight of the atmoſphere, which preſſes upon every body, being equal to ſo many fifteen pounds, as the ſurface of the body contains ſquare inches, the reaſon may be aſked, why men, beaſts, houſes, *&c.* are not cruſhed to pieces by ſuch a prodigious weight of air? This is owing to the equilibrium of the internal air, or the air included in all bodies, which, though it be ſmall, can, by its reaction, counterpoiſe and reſiſt the preſſure of the external air, how great ſoever it be, as is proved by ſeveral experiments upon the air-pump, already mentioned under the article AIR. See ACTION and REACTION.

If it be required to find the weight of the whole atmoſphere upon the earth's ſurface, we may proceed thus: ſuppoſe the earth's diameter in round numbers 8000 miles, the area of a great circle will be $8000 \times 8000 \times 3.7854 = 50266400$ ſquare miles, which multiplied by 4 gives 201065600 ſquare miles for the ſurface of the earth; but, becauſe we took the diameter a little too large, we may take 200,000,000 for the number of ſquare miles in the earth's ſurface; in one ſquare mile are $(5280 \times 5280 =)$ 27878400 ſquare feet, therefore on the earth's ſurface we have 5575680000000000 ſquare feet, which multiplied by 2660 (the preſſure on each ſquare foot) gives 14831308800000000000 pounds troy for the whole preſſure.

The atmoſphere is not only admirably fitted for the reſpiration and nouriſhment of animals, to the growth of vegetables, the production and propagation of ſounds, *&c.* but helps alſo to make our habitable earth that beautiful ſcene of variety which it now is. If it were not for the atmoſphere, the ſun and ſtars would give us no light, but juſt when we turn our eyes upon them: the brightneſs of the ſun would indeed be greater than it is; but, if we turned our eyes from him towards any other part of the heaven, it would appear as dark and full of ſtars as in a bright ſtar-light in winter. As for the various bodies, which are upon the earth, they would all, without the atmoſphere, appear to us as dark as at midnight, except only thoſe parts of them which happened to be in ſuch a poſition, that the rays of the ſun, falling upon them, were reflected to our eyes. It is eaſy to imagine how much of the beauty of the viſible creation would be loſt in theſe circumſtances, beſides the inſupportable prejudice to the eyes of all creatures, by paſſing ſo ſuddenly from pitchy darkneſs to exceſſive light. The numberleſs

berleſs ſmall particles of various kinds, which float in the air, receive the light from the ſun, and, like ſo many ſmall ſpecula or looking glaſſes, reflect and ſcatter it through the air, and this occaſions that light, which we ſee in the day-time, by which our eyes are affected ſo ſtrongly, as to render the fainter light of the ſtars inſenſible. By this means the ſtars are illuminated all round us by the ſun, not only whilſt he is above our horizon, but alſo for ſome time before his riſing, and after his ſetting, ſo long as any of his rays can either directly, or by refraction, reach any part of the atmoſphere within our viſible horizon; for the air, as well as all other mediums which tranſmit light, refracts or bends the rays of it, if they come into it from a different medium; this property of the air is exceedingly beneficial to the inhabitants of the earth, as it lengthens the days by the addition of the twilight; but it gives aſtronomers ſome trouble, as it changes a little the places of all the heavenly bodies, and makes them appear higher than they really are, and muſt therefore be taken into the account, if we would be exact. The ancients were not well acquainted with the refraction of the air, which renders many of their obſervations of the heavenly bodies, eſpecially near the horizon, liable to uncertainty. See LIGHT, REFLECTION, REFRACTION, TWILIGHT, STARS, *&c.*

ATRIUM, or PORCH, in architecture. See the article PORCH.

ATTRACTION. (*Dict.*) Attraction and repulſion differ in no other reſpects than this, that the attractive virtue, in the firſt caſe, carries bodies towards the attracting body; and, in the latter, it carries them from it. In each caſe, the particles are moved in the ſame manner among themſelves by the attracting, electric, or magnetic power. See REPULSION, ELECTRICITY, and MAGNETISM.

That the attraction of gravitation and coheſion is the act of an immaterial cauſe, in virtue whereof inactive matter performs the offices for which it was deſigned; or that theſe diſpoſitions in bodies are not the reſult of any mechanical cauſe whatever; that is, ſuch as may ariſe from the effluvia of bodies, or the action of any other material ſubſtance; Mr. Rowning demonſtrates as follows:

In the firſt place, it is well known, that, if gravity acts upon bodies with the ſame degree of intenſeneſs, whether they be in motion or at reſt, it may be demonſtrated, that bodies, when projected, will deſcribe parabolas; and that, when vibrating in cycloids, their vibrations will be iſochronous, *&c.* In the next place, it is well known, that bodies, when projected, do deſcribe parabolas, and that, when vibrating in cycloids, their vibrations are iſochronous, *&c.* From which two properties it demonſtratively follows, that if gravity be the cauſe of the two above-mentioned effects, it muſt act upon bodies with the ſame force, whether they be in motion or at reſt. Again, it is well known, that if attraction of coheſion acts upon rays of light with the ſame degree of intenſeneſs, whatever be the velocity they move with, it may be demonſtrated, that the ratio of the ſine of the angle of incidence to the ſine of the angle of refraction will be given. But in refraction of light, the ratio of theſe ſines is given in fact; if, therefore, attraction of coheſion be the cauſe of the refraction of light, it muſt act upon rays of light with the ſame intenſeneſs, whatever velocity they move with. See the articles LIGHT, REFRACTION, *&c.*

But no effluvia of bodies, no material ſubſtance, and, in ſhort, no material cauſe whatever, can act with the ſame intenſeneſs, or have the ſame effect upon a body in motion, as upon the ſame body at reſt; becauſe body can only act upon body, according to the ſum or difference of their motions. It remains therefore, that the two diſpoſitions herein mentioned are not the reſult of any material cauſe whatever. See the article MOTION.

Under the articles FLUID and CAPILLARY TUBES, may be ſeen how any fluid will aſcend above the common ſurface in capillary tubes, *&c.* by means of attraction; but the moſt notable and obvious motion of fluids, ariſing from attraction, is that of the tides; the theory of which we have explained at large under the article TIDES.

AURES MARINÆ, EAR-SHELLS, in natural hiſtory, a name given to different ſpecies of the haliotis. See the articles AURIS MARINA, HALIOTIS, and plate XXIV. fig. 3.

B.

BALEARES, the ancient name for the iſlands of Majorca, Minorca, and Ivica. See MAJORCA, *&c.*

BARRACOL, in ichthyology, the engliſh name of the ſmooth raja, with ſpines about the eyes, and three rows of them at the tail. See the article RAJA.

BARRERIA, in botany, a genus of the *pentandria-tetragynia* claſs of plants, the corolla whereof is compoſed of five oval petals, with very long filiform ungues; the antheræ are ſimple; the germen is rude, immerſed in the cup, and quinquifid; the ſtyles are five, they are filiform, and of the length of the ſtamina; the ſtigmata are obtuſe.

BASS, (*Dict.*) among gardeners, a ſoft kind of ſedge or ruſh uſed in binding plants, *&c.*

BEAR'S BREECH, *acanthus*, in botany. See the article ACANTHUS.

BENCH, (*Dict.*) *King's* BENCH. See the article KING'S BENCH.

BERNACLE, or CLAKIS, in ornithology, the anas with the head and neck black. See the article ANAS.

This is a very ſingular bird: it is conſiderably ſmaller than the common gooſe, but larger than the duck; the head is large and rounded; the eyes are large; the beak is black, and much ſmaller than in the common gooſe, though broader in proportion to its length; the under-part of the body is white, with ſomewhat of an admixture of grey; the back is variegated with black and grey, and the covering feathers of the tail are part white, and part black; the tail is black, and the covering feathers of the wings are very elegantly variegated with black, grey, and white.

This is the bird which Gerard, and ſome other authors, have declared to be produced from a peculiar ſpecies of ſhell-fiſh, called the bernacle-ſhell, found on decayed wood that lies about the ſea-ſhores. The love of wonderful obſervations raiſed this firſt account of the bird's being produced from a ſhell-fiſh, that uſually adhered to old wood, into the ſtory of that ſhell's growing upon a tree in manner of its fruit. The whole matter that gave origin to this ſtory is, that the ſhell-fiſh, ſuppoſed to have this wonderful production, uſually adhere to old wood, and that they have a kind of fibrils hanging out of them, which, in ſome degree, reſemble feathers of ſome bird; from which aroſe a ſtory, that they contained real birds.

BETHLEHEM, or BEDLAM-HOSPITAL. See the article HOSPITAL.

BIOTA, in zoology, a genus of ſea-inſects, of a cylindric, but variable figure, with the tentacula arranged in a ſingle ſeries round the aperture of the mouth, at the extremity of the body.

Among the ſeveral other ſpecies of this genus is the polype. See POLYPE.

BIRD'S NEST, in botany, the engliſh name of the neottia. See NEOTTIA.

BIRDS-NESTS, in cookery, the neſts of a ſmall indian ſwallow, very delicately taſted, and frequently mixed among ſoups. On the ſea-coaſts of China, at certain ſeaſons of the year, there are ſeen vaſt numbers of theſe birds; they leave the inland country at their breeding-time, and come to build in the rocks, and faſhion their neſts out of a ſpumous matter, which they find on the ſhore waſhed thither by the waves. They are of a hemiſpheric figure, and of the ſize of a gooſe's egg, and, in ſubſtance, much reſemble the ichthyocolla or iſinglaſs. The Chineſe gather theſe neſts, and ſell them to all parts of the world; they diſſolve in broths, *&c.* and make a kind of jelly of a very delicious flavour.

BITE, (*Dict.*) in ſurgery. Heiſter obſerves, that the bites of enraged animals, though they were not mad at the time they inflicted them, are uſually attended with very grievous conſequences. If the wound is ſlight, the diſcharge of blood from the part is to be encouraged by preſſing it with the fingers, ſucking it in the mouth, or by the application of cupping-glaſſes, or enlarging it with a lancet. It is afterwards to be waſhed with warm ſpirit of wine, and bolſters dipped in the ſame liquor, are to be applied to it, repeating the application every three or four hours, till all danger of inflammation is gone off. If the wound be conſiderably deep, it is always neceſſary to enlarge it with the knife, unleſs it have already a very large opening; and, after applying ſpirit of wine for the firſt days, to prevent the bad ſymptoms, it may be eaſily healed with honey, or ſome digeſtive

digeſtive ointment, and afterwards with a vulnerary balſam, as uſual in other wounds. See the articles HYDROPHOBIA and WOUND.

BLUE. (*Dict.*) *Pruſſian* BLUE. See the article PRUSSIAN BLUE.

BOB, (*Dict.*) in ringing, denotes a peal conſiſting of ſeveral courſes or ſets of changes.

BOLT-HEAD, among chemiſts, the ſame with cucurbit. See CUCURBIT.

BONE. (*Dict.*) *Neper's* BONES. See the article NEPER'S BONES.

BOREA, in natural hiſtory, the name whereby the antients called the bluiſh, green, ſofter, and dull jaſper. See the article JASPER.

This ſtone is generally accounted of the malachites kind, but improperly, as it is much ſofter than that; and ſome have imagined the variety of this ſpecies to be the turquoiſe of the moderns, but erroneouſly. It is conſiderably heavy, and though but moderately hard, is yet capable of a very elegant poliſh.

BREEDING, (*Dict.*) in a moral ſenſe, denotes a perſon's deportment or behaviour in the external offices and decorums of ſocial life. In this ſenſe, we ſay, well-bred, ill-bred, a man of breeding, *&c.* Good breeding is hard to be defined; and none can underſtand the ſpeculation, but thoſe who have the practice. Good breeding amounts to much the ſame with what is otherwiſe called politeneſs, and, among the antient Romans, urbanity. Good breeding is near to virtue, and will of itſelf lead a man a great part of the way towards the ſame; it teaches him to rejoice in acts of civility, to ſeek out objects of compaſſion, and be pleaſed with every occaſion of doing good offices. Lord Shaftesbury compares the well-bred man with the real philoſopher: both characters aim at what is excellent, aſpire to a juſt taſte, and carry in view the model of what is beautiful and becoming. The conduct and manners of the one is formed according to the moſt perfect eaſe and good entertainment of company; of the other, according to the ſtricteſt intereſt of mankind; the one according to his rank and quality in his private ſtation; the other, according to his rank and dignity in nature. Horace ſeems to have united both characters,

Quid verum atque decens curo & rogo, & omnis in hoc ſum.

BREEMING, in ſea-language, denotes the burning off the weeds, filth, *&c.* which a ſhip contracts under water, with furze, faggots or reeds, before her bottom is caulked and graved; and is to be done when in the dock, on the careen, or on the ground aſhore.

BROOKLIME (*Dict.*) is alſo the engliſh name of the lateral cluſter-flowered veronica, with oval leaves and creeping ſtalks. See the article VERONICA.

C.

CÆMENTATION. (*Dict.*) For the method of making ſteel by cæmentation, ſee the article STEEL.

CAKE, a finer ſort of bread, denominated from its flat round figure. See the article BREAD.

We meet with divers compoſitions under the name of cakes; as ſeed-cakes, made of flour, butter, cream, ſugar, coriander and caraway ſeeds, mace, and other ſpices and perfumes, baked in the oven; plumb-cake, made much after the ſame manner, only with fewer ſeeds, and the addition of currants; pan-cakes, made of a mixture of flour, eggs, *&c.* fried; cheeſe-cakes, made of cream, eggs, and flour, with, or without cheeſe-curd, butter, almonds, *&c.* oat-cakes, made of fine oaten-flower, mixed with yeſt, rolled thin, and laid on an iron or ſtone to bake over a ſlow fire; ſugar-cakes, made of fine ſugar beaten and ſearced with the fineſt flour, adding butter, roſe-water, and ſpices: roſe-cakes, placentæ roſaceæ, are leaves of roſes dried and preſſed into a maſs, ſold in the ſhops for epithems.

CALABASH, (*Dict.*) in commerce, a light kind of veſſel made of the ſhell of a gourd, emptied and dried, ſerving for a caſe to put divers kinds of goods in; as pitch, roſin, and the like. The Indians alſo, both of the north and ſouth ſea, put the pearls they have fiſhed in calabaſhes; and the negroes, on the coaſt of Africa, do the ſame by their gold duſt.

The

The ſmaller calabaſhes are alſo frequently uſed by theſe people as a meaſure, by which they ſell theſe precious commodities to the Europeans. The ſame veſſels likewiſe ſerve for putting in liquors, and do the office of cups as well as of bottles for ſoldiers, pilgrims, *&c.*

CALENTES, in logics, a ſort of ſyllogiſm in the fourth, commonly called galenical, figure, wherein the major propoſition is univerſal and affirmative; and the ſecond or minor, as well as the concluſion, univerſal and negative.

This is intimated by the letters it is compoſed of, where the A ſignifies an univerſal affirmative, and the two E's as many univerſal negatives. *Ex. gr.*

CA. Every affliction in this world is only for a time.

lEn. No affliction, which is only for a time, ought to diſturb us.

tEs. No affliction ought to diſturb us, which happens in this world.

The Ariſtotelians, not allowing the fourth figure of ſyllogiſms, turn this word into CElAntEs, and make it only an indirect mood of the firſt figure. See the article CELANTES.

CALIGA, in roman antiquity, was the proper ſoldier's ſhoe, made in the ſandal-faſhion, without upper-leather to cover the ſuperior part of the foot, though otherwiſe reaching to the middle of the leg, and faſtened with thongs. The ſole of the caliga was of wood, like the ſabot of the french peaſants, and its bottom ſtuck full of nails, which clavi are ſuppoſed to have been very long in the ſhoes of the ſcouts and ſentinels; whence theſe were called by way of diſtinction, caligæ ſpeculatoriæ, as if, by mounting the wearer to a higher pitch, they gave a greater advantage to the ſight. The others will have the caligæ ſpeculatoriæ to have been made ſoft and woolly, to prevent their making a noiſe.

CAMOMILE, or CHAMÆMILE, *chamæmilum*, in botany. See the article CHAMÆMILE.

CAMPHORATED. (*Dict.*) CAMPHORATED JULEP. See the article JULEP.

CANNIBAL, or CANIBAL, is uſed by modern writers for an anthropophagus, or man-eater, more eſpecially of the Weſt-Indies. See ANTHROPOPHAGY.

CAOLIN, or KAOLIN. See KAOLIN.

CARACARA, (*Dict.*) for a repreſentation of which, ſee plate XXXVI. fig. 6.

CARICA (*Dict.*) is alſo a name uſed by medical writers for the fruit of the fig-tree. See the articles FIG and FICUS.

CARVER, a cutter of figures or other devices in wood. See CUTTING *in wood*. This is alſo the name of an officer of the table, whoſe buſineſs is to cut up the meat, and diſtribute it to the gueſts.

CASI, in the perſian policy, one of the two judges under the nadab, who decide all religious matters, grant all divorces, and are preſent at all public acts, having deputies in all the cities of the kingdom. See the article NADAB.

CATERPILLAR. (*Dict.*) For a view of three ſeveral ſpecies, ſee plate XXXVIII. fig. 6.

CHALCEDON, or CALCEDON, a city of Bythinia, in the leſſer Aſia, once the capital of the country, ſtood on the Aſian ſide of the Boſphorus, or ſtrait of Conſtantinople, oppoſite to that city, and near the place where the ſeraglio or palace of Scutari now ſtands: eaſt long. 29°, north lat. 41° 30′.

CHALK. (*Dict.*) CHALK JULEP. See the article JULEP.

CHATTER, or STONE-CHATTER, in ornithology. See STONE.

CHEIRI, WALL-FLOWER, in botany, the name whereby moſt writers call the leucoium luteum vulgare. See LEUCOIUM.

The flowers of this plant are ſaid to be cordial, anodyne, aperient, and emmenagogue.

CHEMISTRY. (*Dict.*) Dr. Shaw divides chemiſtry in general into philoſophical, technical, commercial, and œconomical.

Philoſophical CHEMISTRY he defines a rational art of dividing, or reſolving, all the bodies within our power, by means of all the inſtruments we can procure, as well into integrant as conſtituent parts; and joining theſe parts together again, ſo as to diſcover the principles, relations, and changes of bodies; make various reſolutions, mixtures, and compoſitions; find out the phyſical cauſe of phyſical effects: and hence improve the ſtate of natural knowledge, and the arts thereon depending. See THEORY.

Philoſophical Chemiſtry conſiſts of three parts, *viz* invention, rationale, and experiment; whence it is otherwiſe defined, a particular exercile of the rational and inventive faculties of the mind, leading to experiments, and thence to the diſcovery of cauſes, ſo as to form axioms that ſhall rationally account for phænomena, and diſcover rules of practice for producing

ducing uſeful effects: thus philoſophical chemiſtry is not only a key to all the other parts, but of itſelf diſcovers the cauſes of many natural phænomena, as particularly earthquakes, vulcanos, vegetation, the growth of minerals, &c. See the articles EARTHQUAKE, VULCANO, VEGETATION, &c.

This branch of chemiſtry alſo explains the general forms and qualities of bodies, whereon their properties and effects depend; as volatility and fixedneſs, fluidity and firmneſs, colours, taſtes, odours, effervescences, fermentation, precipitation, congelation, extraction, and the like. See VOLATILITY, FIXEDNESS, COLOUR, TASTE, ODOUR, &c.

From the firſt definition of philoſophical chemiſtry, it follows that the objects of this art are all the bodies within our power, and are therefore taken from the three larger maſſes or regions of the globe, *viz.* the earth, water, and atmoſphere. See LABORATORY, EARTH, &c.

It alſo follows, that the inſtruments of chemiſtry are all thoſe we can any way procure: there are ſeveral inſtruments continually at work in the three larger maſſes, or kingdoms of the globe, *viz.* the earth, water, and atmoſphere, for the immediate production of effects. We evidently find, that metals and minerals are formed within the earth; vegetables on its ſurface, ſhooting into the air; meteors in the atmoſphere; and men, beaſts, and birds, in the confines of the two: the phyſical cauſe of all which, are to be generally ſought as ſo many rules of practice. The principal phyſical agents in nature appear to be, 1. heat, 2. cold, 3. air, or the integrant parts of the atmoſphere, 4. water, and 5. proper beds or matrices. This is matter of direct obſervation; and might occaſion the eſtabliſhing the four elements, fire, air, water, and earth. See the articles HEAT, COLD, AIR, and WATER.

Proper beds or matrices appear to have an inſtrumental agency in the production of natural bodies: Every ſubject of an operation, is neceſſarily contained in ſomething that may, 1. afford it a lodgement, 2. make ſome reſiſtance, and 3. convey heat, cold, water, or air to it, or determine their actions upon it. Thus in vegetation, the matrix earth ſupports the ſeed, reſiſts its ſwelling, and conveys a ſtrained or prepared moiſture to it.

The matrices of gems and ores, not only afford a proper lodgement to the ſubject-matter, but alſo reſiſt its growth, by the preſſure of their ſides: which, however, give way a little, and at the ſame time ſtrain and convey ſuitable juices to the ſubject: and ſomething of this kind is obſerved of the fœtus in utero, the hatching of eggs, &c. inſomuch that cloſeneſs, moderate reſiſtance, or a ſlow-yielding of the ſides of the matrix, and a ſtraining of the juices through them (unleſs ſupplied from within) ſeem requiſite for the formation and production of all vegetable, animal, and mineral ſubſtances. Whence we are furniſhed with a capital rule for the improvement of chemiſtry, natural philoſophy, and arts; and taught that, in order to imitate nature, chemiſtry muſt not be confined to the ſole uſe of fire, as its inſtrument, but occaſionally employ water, cold, air, earth, and proper matrices or veſſels. See VEGETATION, GENERATION, FOETUS, HATCHING, EXPERIMENTAL PHILOSOPHY, &c.

But beſides the natural inſtruments, there is a great variety of artificial ones belonging to chemiſtry, which ſeems to raiſe the power of this art, in ſome reſpects, above the power of nature: thus by means of particular menſtruums, it performs operations which nature of herſelf does not. For inſtance, of all the metals only iron and copper are found naturally converted into vitriol; whereas chemiſtry makes vitriols even of gold, ſilver, tin, and lead. And hence the productions of art may be much more numerous than the productions of nature, or enlarged at pleaſure, to the great enrichment of arts, and the enlargement of the kingdom of man. In which light the numerous productions of the chemical trades may be conſidered, as by fermentation, diſtillation, dying, ſoap-making, the art of glaſs, metallurgy, &c. See the articles MENSTRUUM, FERMENTATION, DISTILLATION, &c.

Another ſet of inſtruments belonging to chemiſtry, are veſſels, furnaces, and utenſils, of which there is a great variety for various purpoſes, and capable of producing numerous changes in bodies, as by amalgamation, cæmentation, effuſion, fermentation, putrefaction, reduction, &c. See the articles LABORATORY, FURNACE, AMALGAMATION, CÆMENTATION, FUSION, &c.

To the above-mentioned, Dr. Shaw adds a new ſet, *viz.* the air-pump, conden-

ſer, digeſtor, microſcopes, burning concaves, priſms, lenſes, portable furnaces, and every other inſtrument that can be invented, or procured, of advantage to the art. See the articles AIR-PUMP, CONDENSER, DIGESTOR, MICROSCOPE, BURNING-GLASS, PRISM, LENS, and FURNACE.

There are two capital ways wherein chemiſtry divides its objects, by the ſeveral inſtruments above-mentioned, *viz.* into integrant parts, and into conſtituent parts. By integrant parts we underſtand ſimilar parts, or parts of the ſame nature with the whole, as filings of iron have the ſame nature and properties as bars of iron. Under this general operation fall thoſe particular ones of triture, limitation, ſolution, amalgamation, ſublimation, *&c.* And by conſtituent parts we mean diſſimilar parts, or parts of a different nature from the whole, as when artificial cinnabar is divided into the quickſilver and ſulphur; and under this general operation come all kinds of reſolutions. See TRITURE, LIMITATION, SOLUTION, *&c.*

Theſe two general operations of chemiſtry bear relation to two general ſtructures of bodies, *viz.* the aggregate, and the mixt. Aggregates, in their reſolution, conſtantly retain their mixture in every the ſmalleſt part or atom; but when mixts are reſolved, the mixture is deſtroyed, and two or more new aggregates are produced; thus when brandy is reſolved, ſpirit of wine, or alcohol, and water are produced. Every ſenſible mixt, or aggregate, is compoſed of many inſenſible ones. Before gold can become ſenſible to us, there muſt be a collection of numerous parts that are ſeparately inſenſible, tho' all of them perfect gold. The minuteſt grain of cinnabar has two different parts, ſulphur and quickſilver. The minuteſt grain of ſalt contains ſand and fixed ſalt; and when quickſilver is diſſolved in aquafortis, the leaſt aſſignable portion of the menſtruum contains a proportionable quantity of mercury to the whole. See ANALYSIS, ALCOHL, GOLD, CINNABAR, SULPHUR, *&c.*

Either the integrant, or the conſtituent parts of bodies being once divided or reſolved, various occaſions in chemiſtry require them to be joined together again, for compoſing a whole like the original ſubject. This operation is the converſe of the former; thus by ſimple mixture we recompoſe brandy from alcohol and water, and by precipitation with a copper-plate, collect the quickſilver diſperſed in aquafortis. See SYNTHETIC *Chemiſtry.*

The reſolutions, mixtures, and compoſitions made by chemiſty are extremely numerous, and may be increaſed *ad infinitum.* Brandy gently diſtilled by the balneum mariæ, as was ſaid before, is reſolved into ſpirit of wine and water. And to this claſs of reſolutions are referrable all kinds of depurations, purifications, ſeparations, clarifications, *&c.* See DEPURATION, PURIFICATION, SEPARATION, CLARIFICATION, *&c.*

By mixture we produce all the artificial vitriols, ſoaps, glaſſes, *&c.* and can compound theſe again, in an almoſt infinite variety; ſo that of the reſolutions, mixtures, compoſitions, and recompoſitions, in chemiſtry, there ſeems to be no bounds; whence great room is left for the making of new chemical diſcoveries.

Philoſophical chemiſtry being, in the definition given by our learned author, a rational art; by which is meant, that it may be conducted by rule, and need not be left to accidental trial and caſual experiment, he endeavours to comprize the rules for conducting it under the following three.

Rule I. When a body is offered in order to have new properties diſcovered in it, different from thoſe general ones offigure, gravity, elaſticity, *&c.* which come under mathematical conſideration, let the body be reſolved by degrees into the ſimpleſt conſtituent parts it is any way capable of, by the inſtruments pointed out above; and let trial be made with each ſeparate part, on a variety of bodies, according to ſome analogy of a previous chemical knowledge, leading from one thing to another, in a ſure or probable method of ratiocination.

Rule II. Let the ſeveral parts obtained by the preceding analyſis be reunited, beginning with two, and proceeding gradually to the whole number; uſing at firſt the gentleſt degree, then the intermediate, and at laſt the higheſt degrees of heat and cold. Thus for example, join the fixed ſalt and oil of a plant together; firſt by ſimple digeſtion, and afterwards by boiling, which affords a third production, diſſimilar to all the reſt, and known by the name of ſoap; ſo again melt the ſame fixed ſalt with the earth of a plant, and this will afford glaſs. Let the laſt attempt be to reunite all the ſeparated parts of the body, in order, if poſſible,

ſible, to form the original ſubſtance again.

Rule III. In every operation performed, let the greateſt diligence and exactneſs of obſervation be uſed, with regard to all the principal phænomena and effects produced. Let the phænomena be duly regiſtred, tabled, conſidered, and compared together, after the ſtrict geometrical manner; the reſult whereof, if there be no conſiderable errors committed, will lead to a knowledge of the ſecret ſprings, motions, inſtruments, and means made uſe of by nature for producing effects. And thus, with the proper care and application, juſt canons or rules of practice may be formed. The following are what the Doctor calls imperfect axioms and canons, deduced from a number of experiments, and the preceding enquiry, for directing farther diſcoveries and improvements in chemical and natural knowledge.

1. We may learn that a true chemiſtry (as it may perhaps be juſtly called) is exerciſed by nature, in the vegetable, animal, mineral, marine, and atmoſpherical regions, and that by it all bodies are produced, converted, renovated, repaired, and maintained; and that in the exact diſcovery, imitation, and controul of this natural chemiſtry, conſiſts the perfection of the artificial. 2. That neither the eye, nor all the ſenſes together, can give us any information of the latent properties of bodies, their natures, and uſes; but only particular trials and experiments, well attended to and conſidered. 3. That experiments are but a kind of dead things, unleſs they have a direct uſe in life, or tend to the raiſing axioms and canons for improving our knowledge, and extending our power over the works of nature. 4. That he who can chuſe fit ſubjects, and place them in proper matrices or including veſſels, ſupply them duly with air and water, heat and cold, may probably produce great effects in imitation of nature. 5. That nature points out three ways of producing phyſical effects, different in fineneſs, *viz.* in beds of earth, beds of water, and beds of atmoſphere; beds of earth for minerals, of water for fiſh, and of atmoſphere for birds, meteors, *&c.* the confines of theſe two for plants and animals, and a rarefied mixture of all matters for meteors. 6. That men may make uſe of the ſame inſtruments as nature does, *viz.* fire, air, water, and earth, and conſequently produce the ſame kind of effects, if ſkill, that is knowledge, be not wanting: whence, to improve in knowledge, is to improve in arts. 7. That chemiſtry is not confined to the uſe of fire only, but, in imitation of nature, may employ cold, air, water, and earth, upon matter, in various degrees of ſimplicity, combination, and mixture, which ſhews an extenſive method of enlarging the bounds of the art. 8. That fire is not only an analyſis in ſome caſes, but alſo a mixer of bodies in others, and this to the advantage of chemiſtry. For if it only ſeparated, it could produce but few effects, in compariſon of that infinite variety it now produces, both by mixture and ſeparation. 9. That it might be proper to try the reciprocation of heat and cold in chemical operations, after the manner of nature in day and night, ſummer and and winter. 10. That body in all its forms is the object of chemiſtry, not conſidered mathematically nor mechanically, but operatively and effectively. 11. That the atoms, or primary ſmall compoſitions of bodies, are inſenſible to us. Thus the firſt particles of gold, ſalts, metals, and minerals, may float in the air, and not be perceived by us till they aggregate or collect together, and make a ſenſible maſs, or produce a ſenſible effect. 12. That ſome operation of the mind is requiſite to digeſt, methodize, and regiſter chemical experiments and obſervations, without which we cannot underſtand the laws obſerved by nature in phyſical operations, nor be able to imitate them; the chemiſtry or regular proceſſes of the mind, being here as neceſſary as the corporeal operations themſelves.

Technical CHEMISTRY is defined to be the application of philoſophical chemiſtry to the immediate ſervice of an art, ſo as to invent, form, aſſiſt, promote, or perfect it in the large way of buſineſs. This branch of chemiſtry is, for the ſake of uſe and commodiouſneſs, divided by our author into four parts, as it relates to ſubjects of the animal, vegetable, and mineral kingdoms, or to ſeveral of them at once. Thus under animal arts comes the art of preparing ſize and glue, tanning, ivory-ſtaining, the dying in wool, ſilk, *&c.* Under vegetable arts comes the art of timber, or the ways of preſerving it ſound againſt the injuries of the weather, the ſea, *&c.* the art of making roſin, pitch, oil of turpentine, charcoal, potaſh, *&c.* the art of brewing and fermenting for wines, vinegars, *&c.* the art of ſugar-making and refining, the

art of ſoap-making, &c. Under mineral arts come the arts of ſalt, copperas, vitriol, borax, pottery, metals, foundery, ſmithery, &c. And laſtly, under mixed arts come the art of paper, the art of ink, the art of japanning, the art of glaſs, the art of pigments, the art of pharmacy, the art of fireworks, &c. all which are proper chemical arts, that fall under technical chemiſtry. See SIZE, GLUE, &c.

Commercial CHEMISTRY is the application of both philoſophical and technical chemiſtry, to the eſtabliſhing, ſupporting, and improving any branch of trade and commerce. Commercial chemiſtry conſiſts of three parts, *viz.* 1. The exerciſe of all the chemical arts in a large manner, ſo as to ſupply more than the demands of a ſingle country, and afford a ſurplus of commodities for exportation and foreign conſumption. 2. The various ways of condenſing, curing, preparing, ſecuring, and fitting natural and artificial commodities for carriage and tranſportation. And 3. The ways of ſupplying the chemical neceſſaries to voyagers and travellers, for founding, ſupporting, and improving trade, traffic, and commerce, in different countries.

It is by means of technical and commercial chemiſtry together, that different countries are ſupplied with lead, tin, iron, ſilver, oil, tallow, tanned hides, pitch, roſin, brimſtone, wax, wines, brandies, ſalt, ſugars, treacle, paper, &c. whereby all trades, traffic, and commerce is ſupported. And to diſcover this kind of contrivances or reductions, is the office of commercial chemiſtry; thus inſtead of importing many tuns of a foreign dying-wood, we are taught to extract its tinging parts, and bring them away in the quantity of a few pounds. It affords the neceſſaries for long trading voyages; it directs to the certain rules of diſcovering the ſophiſtications practiſed in wines, brandies, vinegars, arracks, gold-ſand, gold-bars or ingots, counterfeit gems, &c. and to the way of aſſaying pot-aſh, tincal, ambergreaſe, muſk, and all the drugs, &c. See IRON, SILVER, OIL, &c.

Oeconomical CHEMISTRY is the application of philoſophical, technical, and commercial chemiſtry, to the ſervice and accommodation of a family, being of great uſe and extent, ſo as to be capable of improving all the reſt. This branch is divided with regard to the ſeveral offices of a houſe, wherein, as in ſo many different laboratories, it may be commodiouſly practiſed; for inſtance, in the brew-houſe, the ſtore-room, the kitchen, the dairy, the laundry, and the cellar. Thus by means of œconomical chemiſtry, we are inſtructed in the beſt ways of procuring and brewing with malt, treacle, honey, ſugar, or other vegetable juices; the beſt ways of raiſing and of preſerving yeaſt or wine-lees, for baking or brewing, and of imitating the natural wines of foreign growth. This art directs us how to procure the ſimple and compound waters of vegetables in their greateſt perfection, and to make a ſet of brandies or cordial waters, even from the groſs lees, ſediments, or bottoms of our wine or ale-caſks. Hence alſo we learn the method of preſerving fruits in ſugar, and ſeveral vegetable productions in the way of pickle, &c. and the art of cookery is alſo improveable by this means. See the article BREWING, &c.

Analytical CHEMISTRY, that part of chemiſtry which teaches the art of analyſing vegetable, animal, and mineral ſubſtances, and reſolving them into different parts or principles. See ANALYSIS.

Synthetic or *Synthetical* CHEMISTRY. See the article SYNTHETIC.

CLADONIA, in botany, a genus of moſſes conſiſting of a firm, tough, and flexible matter, formed into ſtalks of a roundiſh figure, ſometimes almoſt ſimple, ſometimes more ramified, and in many of the ſpecies reſembling ſmall ſhrubs.

There are four ſpecies of this genus, *viz.* the forked cladonia, the branched, hollow cladonia, the ſolid, branched cladonia, and the tophaceous cladonia, otherwiſe called the orcelle or canary-weed.

COCCUS. (*Dict.*) in botany, a genus of plants, the characters of which are not perfectly aſcertained. There are male, hermaphrodite flowers, and female ones, diſtinct on the ſeveral parts of the ſame ſpadix; the general ſpatha is compoſite, and the ſpadix ramoſe. In the hermaphrodite flowers, the coralla is divided into three oval, acute ſegments; the ſtamina are ſix ſimple filaments, of the length of the corolla. The female flower has the corolla very minute, but divided alſo into three ſegments; the fruit is large, coriaceous, round, and obtuſely trigonal; the ſeed is a large nut, of an oval figure, acuminated, formed of three valves, obtuſely trigonal, and marked with three holes at the baſe.

COEMETERY, or CEMETERY, (*Dict.*) a dormitory or place ſet apart or conſecrated for the burial of the dead. See BURIAL, SEPULCHRE, &c.

Antiently none were buried in churches or church-yards: it was even unlawful to inter in cities; inſtead of which they had coemeteries without the walls. Theſe were held in great veneration among the primitive chriſtians. The council of Elvira prohibited the burning of torches or tapers, in the day time, in coemeteries. The practice of conſecrating coemeteries is of ſome antiquity: the biſhop walked round it in proceſſion, with the crozier, or paſtoral ſtaff, in his hand, the holy water-pot being carried before, out of which aſperſions were made. In the early ages, the chriſtians held their aſſemblies in the coemeteries, as we learn from Euſebius and Tertullian, the latter of whom calls thoſe *coemeteries* where they met to pray, areæ. Valerian ſeems to have confiſcated the coemeteries, and places deſtined for divine worſhip, which were reſtored again to the chriſtians by Gallian: in the reſcript of that emperor, which is preſerved by Euſebius, coemeteries and places of worſhip are uſed as ſynonymous terms. It being here the martyrs were buried, the chriſtians choſe thoſe places to have churches in, when leave was given them by Conſtantine to build. And hence ſome derive that rule which ſtill obtains in the church of Rome, never to conſecrate an altar, without putting under it the relicks of ſome ſaint.

COLLEGE. (*Dict.*) *Royal* COLLEGE *of Phyſicians*, is alſo a corporation of phyſicians in Edinburgh, erected by king Charles II. granting them, by patent under the great-ſeal, an ample juriſdiction within this city and liberties, commanding the courts of juſtice to aſſiſt them in the execution of their orders. Theſe have the ſole faculty of profeſſing phyſic here, and hold conferences once a month for the improvement of medicine. This college conſiſts of a preſident, two cenſors, a ſecretary, and the ordinary ſociety of fellows, who, upon St. Andrew's day, if it falls on a thurſday, if not on the firſt thurſday after, elect ſeven counſellors, who chuſe the preſident and the other officers for the enſuing year. By their charter the preſident and cenſors have power to convene before them all perſons that preſume to practice phyſic within the city of Edinburgh, or the liberties thereof, without the licence of the college; and to fine them in five pound ſterling. They are alſo impowered to viſit apothecaries-ſhops, and examine apothecaries themſelves; with ſeveral other rights and privileges.

COLLEGE *of Heralds* in Scotland. The principal perſon in the Scottiſh court of honour is lyon king at arms, who has ſix heralds and ſix purſuivants, and a great number of meſſengers at arms under him, who, together, make up the college of heralds. The lyon is obliged to hold two peremptory courts in the year, at Edinburgh, on the 6th of May and the 6th of November, and to call officers of arms and their cautioners before him upon complaints; and if found culpable upon trial, to deprive and fine them and their cautioners. Lyon and his brethren the heralds have power to viſit the arms of noblemen and gentlemen, and to diſtinguiſh them with differences, to regiſter them in their books, as alſo to inhibit ſuch to bear arms as by the law of arms ought not to bear them, under the pain of eſcheating to the king the thing whereon the arms are found, and of a hundred marks Scots to lyon and his brethren; or of impriſonment during lyon's pleaſure. The college of heralds are the judges of the malverſation of meſſengers, whoſe buſineſs is to execute ſummonſes and letters of diligence for civil debt real, or perſonal. See the article HERALD and MESSENGER.

COLLEMA in botany, a genus of moſſes, conſiſting merely of a gelatinous matter, reſembling boiled glue or ſize. This is ſometimes diſpoſed in form of filaments, ſometimes of membranes, and ſometimes of neither, but perfectly ſhapeleſs. No part of fructification has ever yet been diſtinguiſhed in any of the ſpecies of this genus.

COLOURING, (*Dict.*) COLOURING *of leather*. See LEATHER.

COLOURING *of marble*. See MARBLE.

COMB, (*Dict.*) HONEY-COMB. See the article HONEY-COMB.

COPPER, (*Dict.*) In a pamphlet lately publiſhed, intituled, *Serious reflections on the manifold dangers attending the uſe of Copper-veſſels*; the author after obſerving, that copper-utenſils are now employed in almoſt every kitchen in the kingdom, endeavours to ſhew from the very nature of the metal, that theſe utenſils throw out a poiſonous matter, more or leſs, which, mixing with our food, renders it in a greater or leſs degree pernicious. It muſt be obſerved, that the

pernicious

pernicious effects of copper are ſometimes evident, at other times latent. In the firſt caſe it ſtands ſelf-condemned by undeniable facts; in the other, though we cannot ſo certainly demonſtrate its deſtructive properties, yet the preſumption againſt it is very ſtrong. Let us ſuppoſe firſt, that we have a copper-utenſil perfectly new, for inſtance, a preſerving pan, not tinned; if it ſtands quite unuſed but for a ſhort time, the very air, eſpecially a moiſt one, will affect it; there is a foulneſs on the pan acquired we know not how, which if rubbed off with a warm hand, has an extremely diſagreeable ſmell, if we apply it to the tongue, it has a nauſeous taſte. Now if the air alone has power to extract a degree of poiſonous matter from copper, what may we not fear from the many ways theſe utenſils are employed? Secondly, if a little cold water be put into this pan, though perfectly clean, and left to ſtand a few days, the pan is viſibly corroded, as appears by the verdegreaſe all round the ſpot where the water ſettled; water therefore, it is evident, will extract this poiſonous matter from the copper. Now if air and cold water affect this metal, there is much more to be apprehended than from theſe ſimple powers; for ſurely copper when heated muſt have much more force to throw out pernicious particles, than when cold. Therefore, thirdly, if water be long boiled in ſuch a pan, it will be ſo tainted as to become more or leſs diſagreeable both in ſmell and taſte, though even this will be in a different degree, according to the quality of the water ſo boiled. Fourthly, if milk be boiled in this pan, it will acquire ſo nauſeous a taſte as ſcarce to be borne. Fifthly, if vinegar be boiled in it, it will alſo contract a nauſeous taſte, tho' that nauſeouſneſs will be partly moderated by the power of the acid; but that it is impregnated with a portion of verdegreaſe is evident, not only from the taſte of the vinegar, but from its having left every part of the pan which it touched, brighter and clearer, if poſſible, then when it came out of the brazier's ſhop. Sixthly, if ſalt be put into the ſame pan, whether heated or not, and left to ſtand ſome time, it is tinged in different places of a greeniſh hue, which is verdegreaſe exſudated from the pan, tainting thoſe parts of the ſalt which were neareſt to it. Seventhly, it will have the ſame effect upon ſuet, or any other fat ſubſtance melted in it, and left to ſtand for any time; and will not only give that a nauſeous taſte, but will communicate a more nauſeous one to butter melted in it than that which it is apt to give milk. Laſtly, ſugar is alſo capable of extracting the verdegreaſe from copper, but with this too the nauſeous taſte is in part concealed, as well as with the vinegar, by the power of the acid inherent in both. And if from theſe few remarks on the effects that copper has on the ſimple part of our food, we have occaſion to fear its effects, what may we not fear when a multiplicity of ingredients are combined?

Next, the ſame author endeavours to prove, that if verdegreaſe is capable of being exſudated from copper, by water, ſalt, vinegar, and other materials daily uſed in cookery, and that this verdegreaſe, being received into the ſtomac, is capable of affecting our health; not all the methods that have hitherto been uſed to defend us from their poiſon, can juſtify the continuing the uſe of theſe utenſils. For beſides theſe ſmaller veſſels for the purpoſes of preſerving, and ſome other particular uſes, it is well known that thoſe larger ones, called in general coppers, which in thouſands of families ſerve for waſhing, are alſo made uſe of to boil a ham, a large piece of beef, or any other great joint of meat; perhaps too when it is cankered with ſoap, and conſequently rendered ſtill more dangerous. Beſides, tinning though in ſome degree a fence, yet is too weak a one to be depended on, for unleſs we can confide, which in general it is impoſſible to do, that our ſauce-pans, ſtew-pans, &c. will always be kept well tinned, we cannot uſe them with any degree of ſafety.

CORN, (*Dict.*) *Sharping-Corn.* See SHARPING-*Corn.*

CORONATION, the public and ſolemn confirming the title, and acknowledging the right of governing to a king or queen; at which time the prince ſwears reciprocally to the people, to obſerve the laws, cuſtoms and privileges of the kingdom, and to act and do all things conformable thereto. See the articles KING, *&c.*

CORRIGIOLA, (*Dict.*) CORRIGIOLA, in the linnæan ſyſtem of botany, a genus of the *pentandria-trigynia* claſs of plants, the corolla whereof conſiſts of five, oval, patent petals, ſcarce bigger than the cup; there is no pericarpium but the cayx, which cloſing, ſerves in the place of one; the ſeed is ſingle and ovato-triquetrous.

COUNTRY,

COUNTRY, (*Dict.*) FAST COUNTRY *or* SHELF. See SHELF.

CRAW, or CROP *of birds*, *ingluvies*. See INGLUVIES.

CRICKET, the name of an exerciſe or game with bats and balls. The laws of this game, as ſettled by the cricket-club in 1744, and played at the artillery-ground, London, are as follow.

The pitching the firſt wicket is to be determined by the caſt of a piece of money. When the firſt wicket is pitched, and the popping-creaſe cut, which muſt be exactly three feet ten inches from the wicket, the other wicket is to be pitched directly oppoſite at twenty-two yards diſtance, and the other popping-creaſe cut three feet ten inches before it. The bowling-creaſes muſt be cut in a direct line from each ſtump. The ſtumps muſt be twenty-two inches long, and the bail ſix inches. The ball muſt weigh between five and ſix ounces. When the wickets are both pitched, and all the creaſes cut, the party that wins the toſs up may order which ſide ſhall go in firſt, at his option.

The laws for the bowlers. Four balls and over. The bowler muſt deliver the ball with one foot behind the creaſe, even with the wicket, and when he has bowled one ball, or more, ſhall bowl to the number four before he changes wickets; and he ſhall change but once in the ſame innings. He may order the player that is in at his wicket to ſtand on which ſide of it he pleaſes at a reaſonable diſtance. If he delivers the ball with his hinder foot over the bowling-creaſe, the umpire ſhall call no ball, though ſhe be ſtruck, or the player is bowled out, which he ſhall do without being aſked, and no perſon ſhall have any right to aſk him.

Laws for the ſtrikers, or thoſe that are in. If the wicket is bowled down, it is out. If he ſtrikes or treads down, or he falls himſelf upon the wicket in ſtriking, but not in over-running, it is out. A ſtroke or nip over or under his bat, or upon his hands, but not arms, if the ball be held before ſhe touches ground, though ſhe be hugged to the body, it is out. If in ſtriking, both his feet are over the popping-creaſe, and his wicket put down, except his bat is down within, it is out. If he runs out of his ground to hinder a catch, it is out. If a ball is nipped up, and he ſtrikes her again wilfully before ſhe come to the wicket, it is out. If the players have croſſed each other, he that runs for the wicket that is put down, is out; if they are not croſſed, he that returns is out. If in running a notch, the wicket is ſtruck down by a throw before his foot, hand, or bat is over, the popping-creaſe, or a ſtump hit by the ball, though the bail was down, it is out. But if the bail is down before, he that catches the ball muſt ſtrike a ſtump out of the ground-ball in hand, then it is out. If the ſtriker touches or takes up the ball before ſhe is lain quite ſtill, unleſs aſked by the bowler or wicket-keeper, it is out.

Ball, foot, or hand over the creaſe. When the ball has been in hand by one of the keepers or ſtoppers, and the player has been at home, he may go where he pleaſes till the next ball is bowled. If either of the ſtrikers is croſſed in his running ground deſignedly, which deſign muſt be determined by the umpires. *N. B.* The umpires may order that notch to be ſcored. When the ball is hit up, either of the ſtrikers may hinder the catch in his running ground, or if ſhe is hit directly acroſs the wickets, the other player may place his body any where within the ſwing of the bat, ſo as to hinder the bowler from catching her: but, he muſt neither ſtrike at her, nor touch her with his hands. If a ſtriker nips a ball up juſt before him, he may fall before his wicket, or pop down his bat before ſhe comes to it, to ſave it. The bail hanging on one ſtump, though the bail hit the wicket, it is not out.

Laws for the wicket-keepers. The wicket-keepers ſhall ſtand at a reaſonable diſtance behind the wicket, and ſhall not move till the ball is out of the bowler's hand, and ſhall not by any noiſe incommode the ſtriker; and if his hands, knees, foot, or head be over, or before the wicket, though the ball hit it, it ſhall not be out.

Laws for the umpires. To allow two minutes for each man to come in when one is out, and ten minutes between each hand. To mark the ball that it may not be changed. They are ſole judges of all outs and ins, of all fair or unfair play, of all frivolous delays, of all hurts, whether real or pretended, and are diſcretionally to allow what time they think proper before the game goes on again. In caſe of a real hurt to a ſtriker, they are to allow another to remain, and the perſon hurt to come in again; but are not to allow a freſh man to play on either

ſide

ſide on any account. They are ſole judges of all hindrances, croſſing the players in running, and ſtanding unfair to ſtrike; and, in caſe of hindrance, may order a notch to be ſcored. They are not to order any man out, unleſs appealed to by one of the players. Thoſe laws are to the umpires jointly.

Each umpire is the ſole judge of all nips and catches, ins and outs, good or bad runs, at his own wicket, and his determination ſhall be abſolute, and he ſhall not be changed for another umpire without the conſent of both ſides. When the four balls are bowled, he is to call over. Theſe laws are ſeparately.

When both umpires call play three times, it is at the peril of giving the game from them that refuſe to play.

CROP, the collection of corn, hay, *&c.* that any piece of ground affords.

CROP, or CRAW *of birds*, *ingluvies*. See the article INGLUVIES.

CUBITUS (*Dict.*) is alſo a name whereby anatomiſts call the lower-part of the arm, or that more commonly called the fore-arm. See the article ARM.

Fractured CUBITUS. The lower-part of the arm, which is called the cubitus, contains two bones, the radius and ulna: fractures of this part, therefore, ſometimes happen only to one, ſometimes to both theſe bones, and that ſometimes near their extremities, but oftener toward their middle; but, when they are both broke together, the bones are not only very eaſily diſtorted from each other, but they are not to be replaced without very great difficulty alſo: if one only ſhould, on the contrary, be broken, while the other remains whole, the fractured parts do not much recede out of their places, nor are they very difficult to reduce and retain; for the bone remaining ſound, is found, in this caſe, to be a better direction and ſupport than either ſplints or bandages. When the fracture happens toward the lower head, near the pronator quadratus muſcle, the fractured part is ſtrongly drawn by that muſcle, and the intervening ligament that is extended between the radius and ulna, toward the ſound bone; and this makes it more difficult to replace. If the radius is to be replaced, whoſe fragment is contracted towards the ulna, an aſſiſtant muſt hold the arm, while the ſurgeon inclines the patient's hand towards the ulna, to draw back the contracted part of the radius. When this is done, he muſt carefully reduce them by compreſſion on both ſides with his hands, ſo as to reſtore the compreſſed muſcle between the radius and ulna, and the fragments of the radius, to their proper places. In this caſe, Heiſter directs, that the arm be bound up with the proper bandage, and the limb be afterwards placed in a ſort of caſe made of paſteboard, or light wood, to be ſuſpended in a ſling put about the neck.

In ſetting a fracture of the ulna, the whole method muſt be the ſame with this of the radius, except that in the extenſion, the hand muſt be bent toward the thumb, and radius, before the diſtorted part of the ulna can be compreſſed into its proper place. When both bones of the cubitus are broken, the method of cure is much the ſame with that uſed to each of them, when broken ſingly; but there is required more ſtrength and circumſpection, both in the replacing them, and a great deal of caution in applying the bandage to retain them. Care muſt alſo be taken, that, while the arm continues in this caſe a great while, without motion, the mucilage of the joints does not harden, or the ligament become ſtiff, and the arm, or cubitus, be thereby rendered immoveable. To guard againſt this, it will be proper to unbind the arm once in two or three days, and to move it a little carefully and gently, backwards and forwards; and ſometimes to foment it with warm water or oil, by which means its motion will be preſerved.

Luxated CUBITUS. The cubitus conſiſting of two bones, the ulna and radius, is articulated by a gynglymus; and the connection of theſe bones is ſuch, that the ulna, or cubitus, as being the largeſt bone, and ſeated in the lower part of the arm, does of itſelf perform the whole flexion and extenſion of the arm, yet it cannot perform thoſe motions without carrying the radius along with it; but, on the other hand, the radius may be turned along with the hand both inward and outward, without at all moving or bending the ulna, as when the pronation and ſupination of the hand are made thereby. Both theſe bones of the cubitus are ſo articulated with the lower head of the os humeri, that large protuberances are received into deep cavities or grooves, and the whole inveſted and faſtened with exceeding ſtrong ligaments; ſo that, notwithſtanding the cubitus may be luxated in all four directions, outward

or inward, backward or forward, yet it is but ſeldom that it ſuffers a perfect or entire diſlocation, unleſs the upper part of the ulna be broken, or the ligaments of the cubitus much weakened by ſome great external violence. The ſlighter and more recent luxations of this kind are, the more eaſy is the reduction of them. Be the caſe better or worſe, however, the patient muſt be placed in a chair, and both parts of the limb, the humerus and the cubitus, muſt be extended in oppoſite or contrary directions, by two ſtrong aſſiſtants, till the muſcles are found pretty tight, with a free ſpace between the bones; then the luxated bone muſt be replaced, either with the ſurgeon's hands alone, or with the aſſiſtance of bandages, that the proceſſes may fall into their ſinuſes; and when that is done, the cubitus muſt be ſuddenly bent. But if the tendons and ligaments are ſo violently ſtrained, that they can ſcarce perform their office, it will be proper to anoint them with emollient oils, ointments, and the fat of animals; or to apply emollient cataplaſms and fomentations. As ſoon as the reduction has been effected, the articulation muſt be bound up with a proper bandage, and the arm afterwards ſuſpended in a ſling hung about the neck. But care muſt be taken that the bandage is not kept on too long, nor the arm kept entirely without motion all the time, leſt the mucilage of the joint ſhould become inſpiſſated, and the articulation rendered, by that means, ſtiff, or the motion of the part be entirely loſt. To prevent this, it will be proper to undo the bandage every other day, and gently to bend, and extend the limb; afterwards compreſſes dipped in warm wine may be applied, and held on with the bandage.

CUPRESSUS. (*Dict.*) NUX CUPRESSI. See the article NUX.

CURVE. (*Dict.*) *Mechanical* CURVE. See the article MECHANICAL.

CUSHION, a ſoft, handſome pillow for perſons to ſit, or lean on.

D.

DACQS, DAX, or ACQS, a city in France, capital of the territories of les Landes, in the province of Gaſcony, ſituated on the river Adour, weſt long. 1° north lat. 43° 45'.

DANIEL, *or book of* DANIEL, a canonical book of the old teſtament, ſo denominated from its author Daniel, who was a very extraordinary perſon, and was favoured of God, and honoured of men, beyond any that had lived in his time. His prophecies concerning the coming of the Meſſiah, and the other great events of after times, are ſo clear and explicit, that Porphyry objected to them, that they muſt have been written after the facts were done. The ſtyle of Daniel is not ſo lofty and figurative as that of the other prophets; it is clear and conciſe, and his narrations and deſcriptions ſimple and natural; and, in ſhort, he writes more like an hiſtorian than a prophet.

The Jews do not reckon Daniel among the prophets; part of his book, that is from the 4th verſe of the 2d chapter to the end of the 7th chapter, was originally written in the chaldee language, the reaſon of which was, that in that part he treats of the chaldean or babyloniſh affairs; all the reſt of the book is in hebrew. The ſix firſt chapters of the book of Daniel are an hiſtory of the kings of Babylon, and what befel the Jews under their government. In the ſix laſt, he is altogether prophetical, foretelling not only what ſhould happen to his own church and nation, but events in which foreign princes and kingdoms were concerned.

DARTUS, or DARTOS, in anatomy, the inner coat of the ſcrotum, compoſed of a great number of muſcular or fleſhy fibres, whence ſome conſider it as a cutaneous muſcle. It is by means hereof, that the ſcrotum is contracted, or corrugated, which is eſteemed a ſign of health. See the article SCROTUM.

DAY, (*Dict.*) LADY-DAY. See LADY. *Quarter*-DAY. See the article QUARTER. *Stationary* DAYS. See STATIONARY.

DECUMANA, in antiquity, a kind of very large ſhields, otherwiſe called albeſia, uſed by the Albenſes, a nation of the Marſi.

DEMIVOLT, in the menage. See the article VOLT.

DENTICLE, or DENTILE, in architecture. See the article DENTILES.

DEW. (*Dict.*) *Mill*-DEW, *rubigo*. See the article RUBIGO.

DIAGONAL, (*Dict.*) DIAGONAL-SCALE. See the article SCALE.

DIPTERA, in the hiſtory of inſects, that order of inſects which have only two wings, and under each of them a ſtyle or oblong body, terminated by a protuberance, or head, and called a balancer.

DISTANCE, (*Dict.*) Dr. Berkely, in his eſſay on viſion, maintains that diſtance cannot of itſelf and immediately be ſeen, for diſtance being a line directed endwiſe to the eye, it projects only one point in the fund of the eye, which point remains invariably the ſame, whether the diſtance be longer or ſhorter. But Mr. Mac Laurin obſerves, that the diſtance here ſpoken of, is diſtance from the eye; and that what is ſaid of it muſt not be applied to diſtance in general. The apparent diſtance of two ſtars is capable of the ſame variations as any other quantity or magnitude. Viſible magnitudes conſiſt of parts into which they may be reſolved as well as tangible magnitudes, and the proportions of the former may be aſſigned as well as thoſe of the latter; ſo that it is going too far to tell us, that viſible magnitudes are no more to be accounted the object of geometry than words; and that the ideas of ſpace, outneſs, and things placed at a diſtance, are not, ſtrictly ſpeaking, the object of ſight; and are not otherwiſe perceived by the eye than by the ear.

DOG, (*Dict.*) SETTING-DOG. See the article SETTING DOG.

DOR-MOUSE, a ſpecies of mus with a long hairy tail, and a white throat. See the article MUS.

This is a very pretty creature, of the bigneſs of the common mouſe; the head is ſmall, and not ſharp at the ſnout, as in many ſpecies: the ears are broad and ſhort; the eyes are large, bluiſh, bright, and very prominent; the head is of a reddiſh brown, very bright and ſhining; the back is of a duſkiſh brown, with a tinge of orange-colour; the belly is of the ſame colour, but ſtill paler; we have it in our fields and gardens, and call it the dor-mouſe, or ſleeper, from its naturally ſleeping all the winter-part of the year.

DORNOCH, a royal borough, and port town, of the county of Sutherland, in Scotland, ſituated on a firth of the ſame name, oppoſite to Taine, in weſt long. 3° 53, north lat. 58°.

DREAMS. According to Wolfius every dream takes its riſe from ſome ſenſation, and is continued by the ſucceſſion of phantaſms in the mind. His reaſons are, that when we dream we imagine ſomething, or the mind produces phantaſms; but no phantaſm can ariſe in the mind, without a previous ſenſation: hence neither can a dream ariſe without ſome previous ſenſation. He obſerves farther, that tho' it be certain a priori, from the nature of the imagination, that dreams muſt begin by ſome ſenſation, yet that it is not eaſy to confirm this by experience; it being often difficult to diſtinguiſh thoſe ſlight ſenſations, which give riſe to dreams from phantaſms or objects of imagination. Yet this is not impoſſible in ſome caſes, as when the weak ſenſation ſufficient to give riſe to a dream gradually becomes ſtronger, ſo as to put an end to it, as it often happens in uneaſy and painful ſenſations.

The ſeries of phantaſms, or objects of imagination which conſtitute a dream, ſeem to be ſufficiently accounted for, from the law of imagination, or of aſſociation; tho' it may be extremely difficult to aſſign the cauſe of every minute difference, not only in different ſubjects, but in the ſame, at different times, and in different circumſtances. We have an eſſay on this ſubject by M. Formey, in the Mem. de l' Acad. de Berlin. tom. 2. p. 316. He expreſsly adopts Wolfius's propoſition above-mentioned, that every dream begins by a ſenſation, and is continued by a ſeries of acts of imagination, or of phantaſms: and that the cauſe of this ſeries is to be found in the law of the imagination.

Hence he concludes thoſe dreams to be ſupernatural, which either do not begin by ſenſation, or are not continued by the aw of the imagination.

A learned author has lately aſſerted, that our dreams are prompted by ſeparate immaterial beings. He contends, that the phantaſm, or what is properly called the viſion, is not the work of the ſoul itſelf, and that it cannot be the effect of mechanical cauſes; and therefore ſeems to conclude, they muſt be the work of ſeparate ſpirits acting on our minds, and giving us ideas while we ſleep. We muſt refer to the author of this extraordinary hypotheſis,

theſis, for a farther account of it. See eſſay on the phænomenon of dreaming, in the 2d vol. of the enquiry into the nature of the human ſoul, 3d edit. Lond. 1745.

Lord Bacon laments that Ariſtotle dropt the conſideration of what he calls the ſecond art of prediction and impreſſion, or the interpretation of natural dreams, which, from the agitation of the mind, diſcovers the ſtate and diſpoſitions of the body, as he honoured phyſiognomy, or the firſt of theſe arts, with an enquiry: though this has indeed been done by Hippocrates; and he obſerves that though later ages have debaſed theſe arts with ſuperſtitious and fantaſtical mixtures, yet that when purged and truly reſtored, they have a ſolid foundation in nature, and uſe in life. See PHYSIOGNOMONICS. Bacon further obſerves, that the interpretation of natural dreams has been much laboured, but mixed with numerous extravagancies, and adds that, at preſent, it ſtands not upon its beſt foundation, which is, that where the ſame thing happens from an internal cauſe, as alſo uſually happens from an external one, there the external action paſſes into a dream. Thus the ſtomach may be oppreſſed by a groſs internal vapour, as well as by an external weight, whence thoſe that have the night-mare dream that a weight is laid upon them, with a great concurrence of circumſtances: ſo again the viſcera being equally toſſed by the agitation of the waves at ſea, as by a collection of wind in the hypochondria; hence melancholy perſons frequently dream of ſailing and toſſing upon the waters; and inſtances of this kind are numerous.

The phyſicians who have accurately examined the ſtate of their patients in every particular circumſtance, have not omitted at times, to enquire into their dreams in thoſe hours of ſleep which their ill ſtate allows them; and partly from experience, partly from reaſon and analogy, have found, that there are many preſages of diſeaſes to come, and many indications of ſuch as are preſent, but unperceived, at leaſt not ſeen in their full extent, to be had from what the ſenſes ſuffer in dreams. Indeed if dreams are different from what might be expected from the buſineſs of the day, or the turn of thought before, they may always be looked upon as ſigns of a more or leſs diſtempered ſtate of body, and the true condition of that ſtate may often be better learned from them, than from any other means. What has been obſerved by phyſicians in regard to the prognoſtics from dreams, may be ſummed up in the following manner; to dream of fire indicates a redundance of yellow bile; to dream of fogs or ſmoak indicates a predominancy of black bile; to dream of ſeeing a fall of rain or ſnow, or a great quantity of ice, ſhews that there is a redundance of phlegm in the body; he who fancies himſelf converſant among ſtinks, may be aſſured that he harbours ſome putrid matter in his body; to have red things repreſented before you in ſleep, denotes a redundance of blood; if the patient dreams of ſeeing the ſun, moon, and ſtars, hurry on with prodigious ſwiftneſs, it indicates an approaching delirium; to dream of a turbid ſea, indicates diſorders of the belly, and to dream of ſeeing the earth overflowed with water, or of being immerged in a pond or river, indicates a redundance of watery humours in the body; to dream of ſeeing the earth burnt or parched up, is a ſign of great heat and dryneſs; the appearance of monſters and frightful enemies, indicates deliriums in diſeaſes; and to dream often of being thrown down from ſome very high place, threatens an approaching vertigo, or ſome other diſorder of the head, as an epilepſy, apoplexy, or the like. Theſe and a great many others are the obſervations of Hippocrates on the dreams of his patients. From thoſe and from ſome farther aſſiſtances, Lomnius has carried the ſubject to a very great length, and given many rules of judging from them.

DRYPIS, a genus of the *decandria-trigynia* claſs of plants, the corolla whereof conſiſts of five petals, their ungues are of the length of the cup, and narrow; the limb is plane; the bracteæ are divided into two linear obtuſe ſegments; the fruit is a ſmall, globoſe, covered capſule, with only one cell, in which is a ſingle kidney-ſhaped ſeed.

DUAL *number*. See the article NUMBER.

DYING, *(Dict.)* DYING *of leather*. See LEATHER.

E.

EAR. (*Dict.*) *Wounds of the* EAR. Wounds of the external ear are eaſily united by ſticking-plaiſters, unleſs the cartilage is entirely divided, and then it will require the help of the needle, and the application of vulnerary balſams, with the proper compreſſes and bandages. When the ear is wounded in the neighbourhood of the meatus auditorius, great care muſt be taken to prevent the diſcharge of blood and matter into that paſſage, which would do great miſchief to the tympanum; but this may be done only by filling the internal ear with lint or cotton.

EAR SHELLS, *aures marinæ*. See the article AURES.

EARTH. *Figure of the* EARTH. (*Dict.*) From the theory, already given, of the earth, it appears, that, in its ſpheroidical figure, the degrees of latitude increaſe from the equator to the pole; ſo that if, in the equator, a degree conſiſts of ſixty miles in the ſeveral latitudes the miles will be as below:

Lat.	0.	10°.	20°.	30°.	40°.	50°.
M. in a Deg.	60.	59,5.	59,57.	59,67.	59,8.	59,93.
Lat.	60°.	70°	80°.	90°.		
M. in a Deg.	60,06.	60,16.	60,235.	60,26.		

EGLECOPALA, in the hiſtory of foſſils, a name whereby ſome authors call the ſtony bluiſh marle. See MARLE.

ELASTICITY. (*Dict.*) For the elaſticity of the air, ſee AIR.

ELDER-TREE, *ſambucus*, in botany. See the article SAMBUCUS.

ELIXIR. (*Dict.*) *Proprietatis* ELIXIR. See PROPRIETATIS ELIXIR.

ELOHIM, ELOHI, or ELOI, in ſcripture language, one of the names of God. See the article GOD.

Angels, princes, great men, judges, and even falſe gods are ſometimes called by this name. The ſequel of the diſcourſe, Calmet obſerves, is what aſſiſts us in judging rightly concerning the true meaning of this word. It is the ſame as Eloha; one is the ſingular, the other the plural. Nevertheleſs, Elohim is often conſtrued in the ſingular number, particularly when the true God is ſpoken of; but when falſe gods is ſpoken of, it is conſtrued rather in the plural.

ENCYSTED TUMOUR. See the articles TUMOUR and CYST.

ENGINE. (*Dict.*) *Tanning*-ENGINE. See the article TANNING-ENGINE.

EPHESUS, an antient city of Ionia in the leſſer Aſia, ſituated, eaſt long. 27° 40′, north lat. 37° 5′, near the ſea, on the mouth of the river Cauſtrus, which formed a commodious harbour. It was the capital of Aſia during the roman government; and here ſtood the ſo much celebrated temple of Diana.

EQUATION. (*Dict.*) *Transformation of* EQUATIONS. See TRANSFORMATION.

ERINUS, in botany, a genus of the *didynamia-angioſpermia* claſs of plants; the corolla whereof conſiſts of a ſingle, unequal petal; the tube is ovato-cylindric, of the length of the cup, and reflected; and the limb is plane, and divided into five ſegments; the fruit conſiſts of bilocular capſules, ſurrounded by the cup; the ſeeds are numerous and ſmall.

EXTRAORDINARII, in roman antiquity, a body of forces conſiſting of a third part of the horſe and a fifth part of the foot, which was ſeparated from the reſt, with great policy and caution, to prevent any deſign that they might poſſibly entertain againſt the natural forces. A ſelect body of ſoldiers, choſen from among the extraordinarii, were thoſe called ablecti. See ABLECTI.

F

FALLING STAR, in meteorology. See the article STAR.

FEMUR, the THIGH. (*Dict.*) For fractures and luxations of the femur, or thigh-bone, ſee the article THIGH.

FIBULA. (*Dict.*) *Fractures of the* FIBULA. See the article FRACTURE.

Luxation of the FIBULA. Sometimes the fibula is ſeparated by external violence from the thigh-bone, and is then diſtorted either upwards or downwards; this generally happens, when the foot has been luxated outwards. Whenever this happens, the bone is to be firſt reſtored to its natural place, and then properly bound up, and left to the aſſiſtance of nature and

and reſt, till it be grown firm again to the tibia and leg. Heiſter directs, that the patient, in this and the like caſes, be always ſtrictly cautioned not to uſe or bear any ſtreſs upon the diſordered leg too ſoon; the conſequence of which may be worſe than the firſt misfortune. For the reſt of the treatment, ſee the article LUXATION.

FINEERING, or VENEERING. See the article VENEERING.

FINGERS. (*Dict.*) *Superfluous* FINGERS. Infants are often born with ſuperfluous, or ſupra-numerary fingers, which are uſually miſhapen and miſplaced: ſome of theſe are found to have nails and bones like other fingers; others have nothing of this, but are mere maſſes of fleſh. Heiſter is opinion, that theſe ſhould always be amputated in the infancy of the child, but if they are many in number, and the child but weakly, it may be better not to take them all off at one time, but to ſtay ſome time between each amputation, that one may be near well, before another is taken off. They are to be cut off with the ſcalpel or ſciſſars, and the hæmorrhage ſtopped either with dry lint, or with the ſame dipped in ſpirit of wine, and afterwards healed, as common wounds, with vulnerary balſams.

Carious FINGERS. The fingers, when carious or affected by a ſpina ventoſa, are, according to Heiſter, to be amputated three ways. 1. By a pair of ſtrong ſciſſars, or ſharp-edged pincers. 2. By a chizzel ſtruck by a leaden mallet, by which they are ſeparated at one blow: or laſtly, by dividing the next ſound joint with a ſcalpel, and drawing back a part of the ſkin to wrap over the ſtump, that it may heal the ſooner; and this is the beſt method of all, as by this you are in no fear about any ſplinters of the bone being left.

Fractured FINGERS. When one or more of the bones in the fingers are broke, the ſurgeon's buſineſs is carefully to replace what has been removed, and to roll up the finger a little way with a narrow bandage, and then to bind it firmly to the next ſound finger. But it is much more proper, when the finger is maſhed, ſo as to give no hope of a good cure, to take it off at once. See FRACTURE.

Luxated FINGERS. The bones of the fingers and thumbs are liable to luxations of each of their articulations, and that in ſeveral directions; but theſe are accidents not only eaſily diſcovered, but very eaſily remedied alſo; for the ligaments being not very robuſt, the fat and muſcles thin, and the ſinuſes of the articulations ſhallow, the extenſion is very eaſy, and the reduction of them into their former places not leſs ſo. The beſt method is to extend ſufficiently the finger with one hand, and to replace the luxated bone at the ſame time with the other, and to retain it ſo by a proper bandage.

FIRE. (*Dict.*) *Extinguiſhing of* FIRES. The world has long been of an opinion, that a more ready way, than that in general uſe, might be found for extinguiſhing fires in buildings; and it has been generally attempted upon the doctrine of exploſion. Zachary Greyl was the firſt perſon who put this plan into execution with any tolerable degree of ſucceſs. He contrived certain engines, eaſily manageable, which he proved before ſome perſons of the firſt rank, to be of ſufficient efficacy, and offered to diſcover the ſecret by which they were contrived, for a large premium, given either from the crown, or raiſed by a ſubſcription of private perſons. But this ſcheme meeting with no better ſucceſs than things of this nature uſually do, he died without making the diſcovery. Two years after this, the perſon, who had his papers, found the method, and it was ſhewn before the king of Poland and a great concourſe of nobility at Dreſden, and the ſecret purchaſed at a very conſiderable price. After this, the ſame perſon carried the invention to Paris and many other places, and practiſed it every where with ſucceſs. The ſecret was this: A wooden veſſel was provided holding a very conſiderable quantity of water: in the center of this was fixed a caſe made of iron-plates, and filled with gun powder; from this veſſel, to the head of the larger veſſel containing the water, there was conveyed a tube or pipe, which might convey the fire very readily through the water to the gun-powder contained in the inner veſſel. This tube was filled with a preparation eaſily taking fire, and quickly burning away; and the manner of uſing the thing was, to convey it into the room or building where the fire was, with the powder in the tube lighted. The conſequence of this was, that the powder in the inner caſe ſoon took fire, and with a great exploſion burſt the veſſel to pieces, and diſperſed the water every way; thus was the fire put out in an inſtant, though the room was flaming before in all parts at once. The advantage

vantage of this invention was, that, at a ſmall expence, and with the help of a few people, a fire in its beginning might be extinguiſhed; but the thing was not ſo general as it was at firſt expected that it would prove, for though of certain efficacy in a chamber or cloſe building, where a fire had but newly begun, yet when the miſchief had increaſed ſo far that the houſe was fallen in, or the top open, the machine had no effect. This was the thing firſt diſcovered by Greyl, and from which our chemiſt Godfrey took the hint of the machine, which he called the water-bomb, and would fain have brought into uſe in England.

FLOOD. (*Dict.*) *Sand* FLOOD. See SAND.

FORNAGE, *fornagium*, in our old writers, ſignifies the fee taken by a lord from his tenants, bound to bake in the lord's oven, or for a permiſſion to uſe their own: this was uſual in the northern parts of England.

FOUNTAIN. (*Dict.*) FOUNTAIN-*pen*. See the article PEN.

FRIDAY, the ſixth day of the week, ſo called from Friga, a goddeſs worſhipped by the Saxons on this day.

Every Friday throughout the year, in the church of England, is a faſt, (except Chriſtmas-day, which, even though it happen on a Friday, is always a feſtival,) in compliance with the cuſtom of the primitive church, which always obſerved this as a faſt, in commemoration of our Saviour's crucifixion. It was one of their ſtationary days, when they uſually forbore eating till three o'clock in the afternoon.

Good-FRIDAY, a faſt of the chriſtian church, in memory of the ſufferings and death of Jeſus Chriſt, obſerved on the holy, or paſſion-week, and called good, by way of eminence, becauſe of the bleſſed effects of our Saviour's ſufferings, which were a propitiatory and expiating ſacrifice for the ſins of the world. See the article PASSION-WEEK.

On Good-Friday the pope ſits on a plain form, and after ſervice is ended, when the cardinals wait on him back to his chamber, they are obliged to keep a deep ſilence as a teſtimony of their ſorrow. In the night of Good-Friday, the Greeks perform the obſequies of our Saviour round a great crucifix laid on a bed of ſtate adorned with flowers; theſe the biſhops diſtribute among the aſſiſtants, when the office is ended. The Armenians, on this day, ſet open a holy ſepulchre, in imitation of that on mount Calvary.

FUSION. (*Dict.*) For the manner of making ſteel by fuſion, ſee STEEL.

G.

GALEGA, GOAT'S RUE, in botany. See the article RUTA.

GALENIA, in botany, a genus of the *octandria digynia* claſs of plants, having no corolla; the calyx is a very ſmall, hollow perianthium, divided into four oblong ſegments; the antheræ are didymous; and the fruit a roundiſh, bilocular capſule, containing two oblong and angulated ſeeds.

GALEOPSIS, HEMP-LEAVED DEAD-NETTLE, in botany, a genus of the *didynamia-gymnoſpermia* claſs of plants; the corolla whereof conſiſts of a ſingle ringent petal; the tube is ſhort, and the limb dehiſcent; there is no pericarpium; the cup is rigid, and contains in its bottom four, triquetrous, truncated ſeeds.

GALLERY. (*Dict.*) *Whiſpering* GALLERY. See WHISPERING.

GAOL. (*Dict.*) GAOL-FEVER, the ſame with that termed the hoſpital or camp-fever. See HOSPITAL-FEVER.

GARLIC, *allium*, in botany, a genus of the *hexandria-monogynia* claſs of plants; the corolla whereof conſiſts of ſix, oblong, concave, erect petals; the fruit is a very ſhort, broad capſule, of a trilobated figure, conſiſting of three valves, and containing three cells; the ſeeds are numerous, and of a roundiſh figure.

This genus comprehends the common garlic, the yellow moly, the onion, the leek, and the long onion.

The ſeveral ſpecies of this genus agree in medicinal virtues with the cepa, or onion. See the article CEPA.

GENERATION. (*Dict.*) *Equivocal* GENERATION. See EQUIVOCAL.

GENE-

GENERICAL. (*Dict.*) GENERICAL NAME, in natural hiſtory, the word uſed to ſignify all ſpecies of natural bodies, which agree in certain eſſential and peculiar characters, and therefore all of the ſame family or kind; ſo that the word uſed as the generical name, equally expreſſes every one of them, and ſome other words expreſſive of the peculiar qualities or figures of each are added, in order to denote them ſingly, and make up what is called the ſpecific name. Thus the word roſa, or roſe, is the generical name of the whole ſeries of flowers of that kind, which are diſtinguiſhed by the ſpecific names of the red roſe, the white roſe, the apple-roſe, *&c.* The ignorance of former ages in the true principles of natural hiſtory, has occaſioned the bodies, which are the objects of it, to be arranged into very unnatural ſeries under the name of genera; and theſe have been called by names as improper, as the characters they were diſtinguiſhed by. Linnæus has done a great deal in the exploding the bad generical names in botany, and Artedi has applied his rules about the formation of theſe names with very little difference to the ſubjects of ichthyology. See the articles BOTANY and ICHTHYOLOGY.

GEODES, in natural hiſtory, a genus of ſiderochita, conſiſting of cruſtated bodies, incloſing a ſmall quantity of earthy or arenaceous matter. See SIDEROCHITA. Of this genus are the following known ſpecies. 1. The cracked geodes, with ferrugineous, brown, and yellow cruſts. 2. The wrinkled geodes, with ferrugineous, reddiſh, brown, and gold-yellow cruſts. 3. The ſparkling geodes, with ferrugineous, purpuliſh, and orange-coloured cruſts. 4. The long ſcabrous geodes, with a ſingle purpuliſh cruſt. And 5. The long geodes, with a ſingle blackiſh cruſt.

GERMANDER. (*Dict.*) *Wild* GERMANDER, in botany, a ſpecies of veronica. See the article VERONICA.

GIBBOUS. (*Dict.*) Gibboſity is a preternatural incurvation of the ſpina dorſi either backward, or on one ſide. Infants are more ſubject to this diſorder than adults, and it often proceeds from external, than from internal cauſes. A fall, blow, or the like violence frequently thus diſtorts the tender bones of infants. When it proceeds from an internal cauſe, it is generally from a relaxation of the ligaments that ſuſtain the ſpine, or a caries of its vertebræ; though the ſpine may be reflected forward, and the back thrown out, by a too ſtrong and repeated action of the abdominal muſcles; and this, if not timely redreſſed, uſually grows up and fixes as the bones harden, till in adults it is totally irretrievable; but when the diſorder is recent, and the perſon young, there are ſome hopes of a cure. The common method is by a machine of paſtboard, wood, or ſteel, which is made to preſs principally upon the gibbous part, and this by long wearing may ſet all right. The ſurgeons however have a different inſtrument, which they call a croſs, much more efficacious, though not quite ſo convenient in the wearing; by the uſe of this, the parts are always prevented from growing any worſe, and are often cured. During the application of theſe aſſiſtances, Heiſter orders the parts to be at times rubbed with hungary water, ſpirit of lavender, and the like, and defended with a ſtrengthening plaſter of oxycroceum, opodeldoc, or the like.

GLAND. (*Dict.*) *Indurations of the* GLANDS. Indurated ſwellings of the glands from viſcid humours, which at length turn callous and cancerous, ariſe from an obſtruction of the veſſels, eſpecially in the glands, and from thick groſs humours. They are known from hard tumours, which are generally moveable and indolent: in this ſtate they are called indurated glands; and if they do not digeſt and ſuppurate in a ſhort time, they grow harder, and are called ſcirrhous glands; and if theſe, eſpecially in the breaſts, begin to corrode and are painful, they are termed carcinomata, or incipient occult cancers. See the articles SCIRRHUS and CANCER.

The indurated glands of the neck in boys proceed from voracity and a bad diet, which, according to Heiſter, are to be cured by correcting the corrupt humours, by external exerciſe, by the force of nature, and a length of time: when this is not performed, and they increaſe and multiply, they become ſcrophulous, and are called the king's evil; when they are large, they are called ſtrumæ: but theſe are ſeldom indurated glands, but rather tunicated humours, which contain various bad humours in bags, and increaſe to a wonderful ſize, inducing different grievous evils. See the articles DIET, EXERCISE, SCROPHULA, CYST, TUMOUR, *&c.*

It is cuſtomary to attempt the cure by various external remedies, but theſe are ſcarcely ſufficient, without correcting the intemperies of the humours; for otherwiſe they generally grow worſe. The remedies for indurated glands are emollients and diſſolvents; ſuch as the infuſions and decoctions of reſolving roots, woods, and herbs, taken twice or thrice a day; ſuch as the roots of ſarſaparilla, with guaiacum; of the roots of ſarſaparilla, china, and ſaſſafras-wood; or of the roots of ſcrophularia or vincetoxicum; likewiſe a decoction of guaiacum with liquorice-root, with the infuſion and decoction of roſemary with ſugar. See the articles EMOLLIENTS, DISSOLVENTS, *&c.*

Beſides theſe, ſuch powders as attenuate the viſcid blood, ſuch as the pulvis ad ſtrumas, of the auguſtan diſpenſatory, to which may be added a grain of cinnabar or mercurius dulcis; likewiſe the crude powder of antimony, eſpecially with a grain of mercurius dulcis in every doſe, which is very uſeful in diſſolving the glands in the neck of boys. The powder of millepedes, from half a ſcruple to a ſcruple, with a grain of mercurius dulcis, is an approved remedy in this caſe, and in hard tumours of the viſcera. Some greatly praiſe ethiops mineral: which remedies are to be continued a long while. As to diet, all auſtere, crude, groſs, flatulent aliment is to be avoided; winter pot-herbs, pulſe, and the like. The quantity of food ſhould likewiſe be leſſened, cold unwholeſome air avoided, as well as ſadneſs and reſt: externally, ſimple ſpirit of wine applied hot, or camphorated with a little ſaffron; likewiſe reſolvent plaſters with mercury, as alſo digeſtive bags of fragrant herbs and flowers. Dedier greatly commends hot ſea-ſand applied to ſcirrhous breaſts. Some commend oil of bricks and the balſam of ſulphur of Rulandus, if rubbed often in a day therewith; in the room of which may be applied a diſtilled oil of ſoap, petroleum, dog's fat, and the martial ointment; after which a plaſter of gum-ammoniac, or ſoap, or melilot, or ſperma ceti muſt be laid thereon; when the tumour is ſoftened, a plaſter of oxycroceum may be properly uſed.

But when the ſalival, maxillary, or parotid glands are indurated, and the ſeveral remedies already mentioned prove unſucceſsful, in order to preſerve the patient from otherwiſe inevitable deſtruction, the dangerous operation of extirpating theſe glands muſt be attempted, in which great care and attention is required, as they adhere to conſiderable branches of the carotid artery; and that, in extirpating them, the patient may bleed to death, if not prevented by the hand of a ſkilful operator. For the operation Heiſter directs, that the ſurgeon be firſt provided with a good ſtyptic-liquor, with a large quantity of lint, linen-rags, a puff-ball, as alſo ſome thick compreſſes, each larger than the other, and a roller of about ſix ells long: theſe being provided, the patient is to be ſeated in a proper light, with his head and hands ſecured by aſſiſtants; then the ſurgeon opens the integuments by a longitudinal inciſion, and, freeing them carefully from the tumour, divides their connecting arteries; hereupon the blood ruſhes forth ſo impetuouſly, that near a pound will be loſt, before the ſurgeon can lay down his knife, and apply the dreſſings; therefore, to ſave the patient, and ſuppreſs the hæmorrhage, he muſt conſtantly apply a bundle of the linen-rags, dipped in ſtyptic, and preſs them cloſe upon the divided arteries: the remaining cavity of the wound muſt be well filled with dry lint and rags, preſſed cloſe with his fingers, over which muſt be impoſed a large piece of puff-ball, with three or four compreſſes, each larger than the other; the whole being at laſt ſecured by the faſcia nodoſa, commonly uſed for arteriotomy in the temples: laſtly, it is to be obſerved, that when the tumour is uncommonly large, it may be more convenient to make a cruciform inciſion thro' the integuments, by which the tumour may be extracted more eaſily than by a longitudinal one. See STYPTIC, BANDAGE, CYST, TUMOUR, *&c.*

For the treatment of the wound. See the article WOUND.

GLOBE-FISH, *orbis*. See ORBIS.

GLOBULAR-SAILING. See SAILING.

GOAT'S BLOOD, *ſanguis hirci*. See the article SANGUIS.

GODWIT, *totanus*, in ornithology. See the article TOTANUS.

GULO, in zoology, a ſpecies of muſtela, of a reddiſh brown colour, with the middle of the back black. See the article MUSTELA.

This is of the ſize of our common cat; the head is ſmall, and of a kind of oval figure, ſlender at the ſnout, and rounded at the crown; the eyes are prominent, though

though not very large; the iris is of a deep hazel; the ears are ſhort and patulous; the noſtrils are large; the mouth is wide, and well furniſhed with teeth.

GUM-BOILS, *parulides*, in ſurgery and medicine. See PARULIDES.

GUNDELIA, in botany, a genus of the *ſyngeneſia - polygamia - æqualis* claſs of plants, the compound flower of which is tubulated and uniform, with the hermaphrodite corollulæ equal; the partial flower is monopetalous and clavated, with a ventricoſe, quinquifid, erect limb; there is no pericarpium; the ſeeds, which are ſolitary, roundiſh, acuminated, and coronated with an obſolete margin, are perfectly immerſed and hid in the receptacle: the common receptacle is conic, and covered every where with partial ones, divided with tricuſpidated paleæ; the partial receptacle is conico-obtuſe, quadrangular, and truncated.

GYMNARTHRIA, in zoology, a name given that order of inſects which have ſoft naked bodies, furniſhed with limbs. See the article INSECT.

GYPSIES, or EGYPTIANS, are, in our ſtatutes, termed a counterfeit kind of rogues, who, diſguiſing themſelves both in their ſpeech and apparel, wander up and down the country, pretending to tell fortunes, cure diſeaſes, *&c.* under which pretence, they abuſe the ignorant, common people, by ſtealing and pilfering from them every thing that is portable, and which they may carry off undiſcovered. In order to ſuppreſs theſe impoſtors, ſeveral ſtatutes have been made; for by 28 H. 8. c. 10. Egyptians coming into England are to depart the realm in fifteen days, or may be impriſoned; and if they continue here above a month, ſhall be deemed guilty of felony. 5 Eliz. c. 20. Probably they might be ſo called from the ancient Egyptians, who had the character of great cheats, whence the name might afterwards paſs proverbially into other languages, as it did into the Greek and Latin; or elſe the ancient Egyptians being much verſed in aſtronomy, or rather aſtrology, the name was afterwards aſſumed by theſe modern fortune-tellers. Be that as it will, there is ſcarce any country in Europe without its gypſies. The Latins call them Egyptii: the Italians, Cingari and Cingani; the French, Bohemiens; others, Saracens, Tartars, *&c.* The firſt time we heard of them in England was in 1563.

H.

HAAM, AAM, or AUME, a liquid meaſure in uſe at Amſterdam, containing about ſixty-three pounds averdupois-weight. See the articles AUME and MEASURE.

HABIT. (*Dict.*) *Angelic* HABIT or GARMENT, among our anceſtors, was a monkiſh garment, which laymen put on a little before their death, that they might have the benefit of the prayers of the monks. It was from them called angelic, becauſe they were called *angeli*, who, by theſe prayers, *animæ ſaluti ſuccurabant*.

HÆMORRHUS, the BLOOD-SNAKE, the name of a peculiar ſpecies of ſerpent; ſo called, becauſe it was ſuppoſed, that, on a perſon's being bit by it, the blood flowed out of every part of the body. It is a ſmall ſerpent, ſeldom arriving to more than a foot long; its eyes are remarkably vivid, bright, and ſparkling; its ſkin is very gloſſy, and its back variegated with a great number of black and white ſpots; its neck is very ſlender; its tail extremely ſharp; and it has a ſort of ſmall horn placed over its eyes: it is found in Egypt. There is alſo an american kind of this ſerpent found in the ſouthern parts of that continent, and called by the natives ahucyatli, which is larger than the other, and reſembles the rattle-ſnake in many particulars, but wants the diſtinguiſhing character of the rattle in the tail. See the articles SERPENT and RATTLE-SNAKE.

HAG-BOAT, a kind of ſhip. See SHIP.

HAGIASMA, or AGIASMA, among antient writers, is ſometimes uſed for the whole church, and ſometimes for the more ſacred part thereof.

HALI, HALY, or *powder of* HALI. See the article POWDER.

HAMMA, or AMMA, a name whereby ſome chirurgical writers call a girdle or truſs, uſed in ruptures. See TRUSS.

It is ſometimes uſed alſo for a knot to faſten a bandage.

HAMMER. (*Dict.*) *Yellow*-HAMMER, in ornithology. See YELLOW-HAMMER.

HAMMER-HEADED SHARK, in ichthyology, the ſame with the zygæna. See the article ZYGÆNA.

HAMMON, or AMMON, in antiquity, a name given to Jupiter in Libya, where was a celebrated temple of that deity.

HARAM, in the turkiſh ſeraglio. See the article SERAGLIO.

HARP. (*Dict.*) HARP-SHELL, in ichthyology, the elliptic, longitudinally coſtated dolium. See DOLIUM.

This is one of the moſt beautiful ſhells of this genus: it is about two inches and a half long, and a little more than an inch and a half in diameter; the clavicle has five volutions; the whole ſurface of the body of the ſhell is ornamented with large and elevated ribs, and the colour is a deep brown, variegated in a beautiful manner with a paler brown.

HEART. (*Dict.*) HEART-BURN, *cardialgia*, in medicine, See the article CARDIALGIA and SODA.

HEART, in the manege. A horſe that works in the manege with conſtraint and irreſolution, and cannot be brought to conſent to it, is ſaid to be a horſe of two hearts.

HEART-SHELL, a name given to two different ſpecies of the cardia. Thus 1. The elegant, compreſſed, and marginated heart-ſhell, or heart-cockle is an extremely tender and delicate ſpecies, about an inch and a quarter in length, and an inch in diameter. 2. The ſharp-backed cardia, with elegant variegations, commonly called the Venus heart-ſhell, much of the ſame ſtructure, delicacy, and variety of colouring with the former. See the article CARDIA.

HEDGE. (*Dict.*) *Plaſhing of quickſet*-HEDGES. See the article PLASHING.

HEDGE-HOG. See HEDGE-HOG.

HEDGE-SPARROW, the brown motacilla, white underneath, and with a grey ſpot behind the eyes. See MOTACILLA.

This is of the bigneſs of the red-breaſt; the head is large and rounded; the eyes ſmall, and their iris hazel; the beak is ſlender; the ears are large and patulous.

HEDYPNOIS, in botany, a ſpecies of lapſana or zacintha. See ZACINTHA.

HELENA, in aſtronomy. See the article CASTOR.

HEN. (*Dict.*) HEN-HARRIER, in ornithology, the falco, with a brown back, and a variegated, black, and brown tail. See the article FALCO.

This is a conſiderably large ſpecies, and is equal to a well grown pullet in ſize: the head is ſmall, and ſomewhat flatted at the top; the beak is large, and very robuſt; it is broad and thick at the baſe, very much hooked, and extremely ſharp at the point; the baſe of it is covered with a thick yellow membrane, in which are ſituated the noſtrils, and there are a kind of black hairs reſembling whiſkers.

HERMINIUM, the MUSK-ORCHIS, in botany, a genus of the *gynandria-diandria* claſs of plants; the corolla whereof conſiſts of five, ovato-oblong, erecto-patulous, and connivent petals; the fruit is an oval, vertical, obtuſely trigonal capſule, armed with three carinæ, trivalvar, unilocular, and dehiſcent underneath the carinæ; the ſeeds, which are numerous, are ſcobiform; the receptacle is linear, and affixed to each valve of the pericarpium.

This genus comprehends the monorchis of Micheli.

HERMIT, in zoology, the long-tailed ſquilla, with a ſoft tail, and the right claw the largeſt. See SQUILLA.

This grows to two inches and a half in length; the legs are ſlender and long, and the anterior ones have claws on them like the common crabs.

HETEROPYRÆ, in natural hiſtory, a genus of foſſils, of the claſs of the ſiderochita, compoſed of various cruſts, ſurrounding a nucleus of a different ſubſtance from themſelves, and often looſe and rattling in them. See the article SIDEROCHITA.

Of this genus Dr. Hill reckons ſeven ſpecies. 1. The hard heteropyra, with brown and purpliſh cruſts, and a whitiſh green nucleus, being a very beautiful foſſil of a ſmooth equal texture, conſiderably compact and cloſe, generally determinate and regular in ſhape and ſize, in form of an oblong-oval figure, and about an inch in length, and half an inch in diameter. 2. The rough purpliſh heteropyra, containing a large nucleus of a very light earth. 3. The miſhapen heteropyra, with ferrugineous, red, and duſky, yellow cruſts, and a greeniſh, white nucleus. 4. The yellow, brown, and black-cruſted heteropyra, with a whitiſh nucleus, being about four inches in length, and three in breadth, and two and a half in thickneſs, of an oblong form, a cloſe compact texture,

and very heavy. 5. The yellow, ferrugineous, and purpliſh-cruſted heteropyra, with a pale yellow nucleus, from four to twelve inches in length, and about the third of its length in breadth, and nearly the ſame in thickneſs. 6. The coarſe, yellow, and brown heteropyra, with a browniſh yellow nucleus of an orbicular form, and between one and two inches in diameter. 7. The coarſe heteropyra, with brown, black, and orange-coloured cruſts, and a yellow nucleus, being of an oblong form, and about an inch and a half in length.

HEXÆDROSTYLA, in natural hiſtory, a genus of foſſils conſiſting of cryſtalliform columnar ſpars, terminated at their ſummit by a pyramid, but adhering irregularly to ſome other body at their baſe. See the article SPAR.

There are three ſpecies of this genus of foſſils. 1. The ſlender hexædroſtylum, with a long pyramid, being ſo pure and clear a ſpar, and ſo much of the ordinary figure of the hexangular cryſtal, that there is no doubt but it has often been miſtaken for cryſtal: its moſt frequent ſize is nearly two inches in length, and a third of an inch in thickneſs, the pyramid being about one fourth of that length. 2. The hexædroſtylum, with a long irregular pyramid, being of a moderately equal, but ſomewhat coarſe and impure texture, and ſubject to ſpots of various earths and minerals, and often ſo altered by them, as not to be known, but by its figure, which it ever keeps regularly to: it is naturally of a duſky white, but moderately tranſparent, conſiderably heavy, and very ſoft. 3. The hexædroſtylum, with a very ſhort pyramid, being uſually of a very pure, clear, and fine texture, but ſometimes ſo debaſed by earthy admixtures, that it becomes very coarſe, and frequently ſpotted, flawed and blemiſhed: it is of various ſizes, but about an inch and a half is its moſt frequent length, and with that the uſual proportion is about half an inch in thickneſs, and the pyramid ſeldom takes up more than one eighth of the length.

HIPPARCHUS's PERIOD, in chronology. See the article PERIOD.

Sanguis HIRCI. See SANGUIS.

HOACTLI, in zoology, the name of an american bird deſcribed by Nieremberg: it is of the ſize of a common hen, the legs and neck are long; its head is black, and is ornamented with a beautiful creſt of the ſame colour; its whole body is of a fine white, but its tail is grey, as are alſo the upper ſides of its wings; the wings have a greeniſh caſt, and the back ſometimes has many black feathers; its feet are not webbed, its legs are of a pale whitiſh colour; it has a circle of white, beginning at the eyes, and going round the head: it is common on the lakes of Mexico, and builds among reeds and ſedge. It bites very deſperately.

HOE. (*Dict.*) *Prong*-HOE. See PRONG.

HOG. (*Dict.*) HEDGE-HOG, *erinaceus*, in zoology, a genus of quadrupeds, the lateral fore-teeth of which are ſhorter than the others; the noſtrils are criſtated; and the body, inſtead of hairs, is clothed, in the manner of that of the porcupine, with ſpines. See the articles QUADRUPED and PORCUPINE.

Of this genus there are two ſpecies. 1. The erinaceus, with larger ears, or the common hedge-hog, being a little animal, conſiderably thick in proportion to its length, and which, when it draws itſelf together at the approach of danger, appears of an oval figure. The length of this creature is about ſeven inches; its head ſmall and oblong, broad towards the upper-part, and growing ſmaller towards the noſe; the mouth is formed very much like that of the badger; the eyes are ſmall, black, and protuberant; the ears are ſhort and broad; the neck is ſhort; the back broad and prominent; the legs ſhort and robuſt; the feet formed like thoſe of the dog; there are five toes on each, and one is ſhorter than the reſt, in manner of a thumb. The other ſpecies is the white erinaceus, with very ſmall ears, being larger than the common hedge-hog, but very like it in form.

Muſk-HOG, *tajacu*, in zoology. See the article TAJACU.

HOITLALLOTL, in zoology, the name of an american bird, deſcribed by Nieremberg, and called by him *avis longa*. It is very remarkable for the ſwiftneſs of its running, and is of a very long ſhape, having alſo a long tail. its beak is alſo very long, black above, and grey underneath: its tail is green, and has all the ſplendor and beauty of the peacock's: its whole body is of a whitiſh yellow, and, near the tail, of a blackiſh yellow; but the ſhoulders are black, with white ſpots. It does not fly high, nor very well, but runs ſo ſwiftly as is ſcarce to be conceived. It is but an ill taſted bird.

HOLOSTEUM, in botany, a genus of the *pentandria-trigynia* claſs of plants, the corolla whereof is compoſed of five plane, patent, tridentated petals, broadeſt towards the ends; the fruit is a cylindrico-conic capſule; the receptacle is free, obſoletely triquetrous, and has very ſhort hairs; the ſeeds are numerous and triquetrous. There is a ſpecies of this genus, in which the ſtamina are only four inſtead of five.

HOMER, OMER, CORUS, or CHOMER, in jewiſh antiquities, a meaſure containing ten baths, or ſeventy-five gallons, and five pints, as a meaſure for things liquid; and thirty-two pecks and one pint, as a meaſure for things dry. The homer was moſt commonly a meaſure for things dry, and the greateſt that was uſed among the Jews: it contained, according to the Rabbins, ten ephahs, or thirty ſata or ſeahs. Corus is the moſt uſual term in the hiſtorical writers, and homer, omer, or chomer, among the prophets.

HOMOCHROA, in natural hiſtory, a genus of foſſils, conſiſting of ſtones compoſed of a cryſtalline matter, conſiderably debaſed by earth, and this of various kinds in the different ſpecies; but ever of one kind only in the ſame ſtone, which is thence always of one plain and ſimple colour, and never ſubject to veins or other variegations.

Of this genus authors reckon five ſpecies. 1. The white homochroum, from half an inch in diameter, to ſeven or eight inches. 2. The red homochroum, from one inch or leſs in diameter, to two or three. 3. The yellow homochroum of various ſizes, from one inch or leſs in diameter, to ſix or ſeven. 4. The bluiſh homochroum, whoſe general ſize is two inches in diameter. And 5. The greeniſh homochroum, from half an inch to two inches in diameter.

All theſe ſpecies are of an orbicular form, a compact and a cloſe texture, and freely give fire with ſteel.

HOOPOE, *upupa*, in ornithology. See the article UPUPA.

HORSE. (*Dict.*) *Stone*-HORSE, or STALLION. See the article STALLION.

Maſter of the HORSE. See MASTER.

HOUND-FISH, the engliſh name of two different ſpecies of the ſqualus. See the article SQUALUS.

1. The ſmooth hound fiſh is the ſmooth ſkinned ſqualus, with obtuſe teeth: this is a large fiſh; the head is of a depreſſed form; the roſtrum is obtuſe; the mouth large; and the teeth are numerous, but ſhort, thick, obtuſe, and granulous; the noſtrils have each two apertures; the eyes are large, and ſtand pretty high on the head; the body is oblong, and of a rounded form; toward the head there are five apertures to the gills on each ſide, they ſtand in a line, running from the head to the pectoral fins; there are two back fins; the pinna ani is but one; the tail is forked or divided into two parts, and the upper portion is much longer than the other.

2. The ſqualus, with a rounded body, and with no pinna ani, is alſo called the hound-fiſh; the head is large, of a depreſſed figure, and ſubacute; the roſtrum, toward the extremity, is pellucid: this fiſh grows to about two yards in length.

HUEN, or WEEN, in geography. See the article WEEN.

HUMETTY, or *Croſs*-HUMETTY, in heraldry, is defined to be a plain croſs of an equal length every way. See CROSS.

HUNDRED. (*Dict.*) HUNDRED WEIGHT. See the article WEIGHT.

HYÆNA, in zoology, a ſpecies of canis, with the hairs of the neck long and erect. See the article CANIS.

This is a very ſingular and a very ugly animal; it is of the bigneſs of a bull-dog; the head is large and ſhort; the noſe obtuſe; the mouth wide, and furniſhed with a terrible armature of teeth; the eyes are large, black, and of a very fierce aſpect; the ears are ſhort, broad, and erect; the neck is very thick, and covered with a kind of briſtles inſtead of hairs, which naturally ſtand erect, and give a very formidable appearance to the creature; the body is bulky and rounded, and the ſhape not unlike that of a pig; the legs are moderately long, and very robuſt; the general colour is a very duſky-olive, approaching to black; the legs are darker, and the face paler, than the reſt: it is a native of many parts of the eaſt, and is an extremely fierce and voracious animal: it is not very ſwift, but is continually lying in wait for other creatures, and ſcarce any thing that comes in its way eſcapes it: its voice is ſhrill, and has a mournful ſound.

HYALINA, in natural hiſtory, a genus of foſſils, conſiſting of talcs, compoſed of very broad and ſingle flakes, each of conſiderable thickneſs, reſembling plates of glaſs, and not fiſſile into thinner ones. Of this genus there is only one known

ſpecies,

ſpecies, *viz.* the brown hyalina, being an extremely pure and very regularly formed body, of a moſt equally laminated ſtructure, and found in maſſes from three to twenty-four inches in diameter; theſe are always flat, very ſmooth, and polite, as if newly ſplit on their horizontal ſurfaces; and very rugged, notched, and chopped on their lateral ones; it ſeldom exceeds four or five inches in thickneſs, even in the largeſt maſſes. See TALCS.

HYBRIS, in grecian antiquity, a denomination given to a ſilver ſtool placed in the aræopagus, on which the plaintiff or accuſer ſtood; as that on which the defendant or perſon accuſed ſtood, was called anædeia. See ANÆDEIA.

Here the plaintiff propoſed three queſtions to the party accuſed, to which poſitive anſwers were to be given. The firſt was, are you guilty of this fact? The ſecond, how did you commit the fact? The third, who were your accomplices?

HYMENOPTERA, in the hiſtory of inſects, a name given to thoſe inſects, which have four wings, and thoſe all entirely membranaceous. See INSECT.

HYOSERIS, SWINE'S SUCCORY, in botany, a genus of the *ſyngeneſia polygamia-æqualis* claſs of plants; the compound flower of which is uniform, with ten hermaphrodite corollulæ diſpoſed into one or more orbs; the partial one is monopetalous, ligulated, linear, truncated, and quinquedentated; the ſtamina are five capillary, very ſhort filaments; there is no pericarpium beſides the cup; the ſeed is ſingle, oblong, compreſſed, of the length of the cup, coronated with a peculiar calyculum and a ſmall capillary down; the receptacle is naked.

This genus comprehends the taraxacona-ſtrum of Vaillant, and the leontodon-toides of Micheli.

I.

JACK. (*Dict.*) *Smoke*-JACK. See the article SMOKE-JACK.

JACK-WAMBASIUM, in our old writers, a kind of defenſive coat-armour, worn by horſemen in war, not made of ſolid iron, but of many plates faſtened together, which ſome perſons by tenure were bound to find upon any invaſion.

JAIL, or GAOL. See the article GAOL.

JANNA, a town of european Turky, the capital of a province of the ſame name, being the antient Theſſaly, ſituated eaſt long. 22°, north lat. 39°.

JANUARY. (*Dict.*) This month contains thirty-one days, and was introduced into the year by NumaPompilius, Romulus's year beginning in the month of March. The chriſtians heretofore faſted on the firſt day of January, by way of oppoſition to the ſuperſtition of the heathens, who, in honour of Janus, obſerved this day with feaſtings, dancings, maſquerades, *&c.* See YEAR.

JASIONE, in botany, a genus of the *ſyngeneſia-polygamia-monogamia* claſs of plants; the partial corolla whereof conſiſts of five lanceolated erect petals, connected at the baſe; the fruit is a roundiſh capſule, bilocular, and coronated with a proper calyx; the ſeeds are ſmall,

JAY, in ornithology, the variegated corvus, with the covering feathers of the wings blue, variegated with black and white. See the article CORVUS.

JEREMIAH, *the prophecy of*, a canonical book of the old teſtament. This divine writer was of the race of the prieſts, the ſon of Hilkiah of Anathoth, in the tribe of Benjamin. He was called to the prophetic office when very young, about the thirteenth of Joſiah, and continued in the diſcharge of it above forty years. He was not carried captive to Babylon with the other Jews, but remained in Judea to lament the deſolation of his country. He was afterwards a priſoner in Egypt with his diſciple Baruch, where it is ſuppoſed he died in a very advanced age. Some of the chriſtian fathers tell us, he was ſtoned to death by the Jews, for preaching againſt their idolatry; and ſome ſay, he was put to death by Pharoh Hophra, becauſe of his prophecy againſt him. Part of the prophecy of Jeremiah relates to the time after the captivity of Iſrael, and before that of Judah, from the firſt chapter to the forty-fourth; and part of it was in the time of the latter captivity, from the forty fourth chapter to the end. The prophet lays open the ſins of Judah with

with great freedom and boldneſs, and reminds them of the ſevere judgments, which had befallen the ten tribes for the ſame offences. He paſſionately laments their misfortune, and recommends a ſpeedy reformation to them. Afterwards he predicts the grievous calamities that were approaching, particularly the ſeventy years captivity in Chaldæa. He likewiſe foretells their deliverance and happy return, and the recompence which Babylon, Moab, and other enemies of the Jews ſhould meet with in due time. There are likewiſe ſeveral intimations in this prophecy concerning the kingdom of the Meſſiah; alſo ſeveral remarkable viſions, and types, and hiſtorical paſſages relating to thoſe times. The fifty-ſecond chapter does not belong to the prophecy of Jeremiah, which probably was added by Ezra, and contains a narrative of the taking of Jeruſalem, and of what happened during the captivity of the Jews, to the death of Jechonias. St. Jerom has obſerved upon this prophet, that his ſtile is more eaſy than that of Iſaiah and Hoſea; that he retains ſomething of the ruſticity of the village where he was born; but that he is very learned, and majeſtic, and equal to thoſe two prophets in the ſenſe of his prophecy.

JESUITES. (*Dict.*) JESUITES-POWDER. See POWDER.

ILLECEBRUM, in botany, a genus of the *pentandria-digynia* claſs of plants, having no corolla; the fruit is a capſule approaching to a roundiſh figure, but pointed at each end, formed of five valves, containing only one cell, and covered by the calyx; the ſeed is ſingle, large, roundiſh, and pointed at each end.

INAMBLUCIÆ, in natural hiſtory, a genus of ſelenitæ, of a columnar, abrupt, and ſeemingly fibroſe texture. See SELENITÆ.

There are only two known ſpecies of this genus, *viz.* the inamblucia, with very fine filaments, and that with whitiſh and black filaments.

INDENTURE, in law, a deed or writing, wherein is contained ſome article, covenant, contract, or conveyance made between two or more perſons; and which is indented or tallied at the top thereof, anſwerable to another part of the ſame deed, *&c.* and having the ſame contents. It differs from a deed-poll, in that this laſt is a ſingle deed, and unindented. See DEED.

INDUCTION. (*Dict.*) INDUCTION, in logics, a conſequence drawn from principles firſt laid down. See the article CONSEQUENCE.

Thus the concluſion of a ſyllogiſm, is an induction made from the premiſes. See SYLLOGISM, CONCLUSION, *&c.*

Induction is alſo uſed for a kind of ſyllogiſm itſelf, being a medium between an enthymeme and a gradation, in regard it wants a propoſition (which however is underſtood) as in the enthymeme, and abounds in aſſumptions (which yet are collateral, or of the ſame degree) which is the caſe in a gradation. See REASONING, ENTHYMEME, and GRADATION.

There are reckoned three kinds of Induction, 1. That which concludes ſome general propoſition from an enumeration of all the particulars of a kind, which is called dialectic induction. In this way of reaſoning, if one part of the enumeration be wanting, it deſtroys the whole. The ſecond kind proceeds by interrogation, and concludes with a probability: This is called παραγωγὴ, and was what Socrates ordinarily made uſe of. The third kind of induction is properly rhetorical, being a concluſion drawn from ſome example or authority.

For a full account of that ſpecies of reaſoning called induction, ſee the article REASONING.

INFERENCE, in matters of literature, a corollary, concluſion, argument, or induction drawn from ſomething that went before. See CONCLUSION, *&c.*

INFLAMMATION, (*Dict.*) INFLAMMATION *of the Tonſils.* See TONSILS.

INK. (*Dict.*) INK-FISH, *ſepia.* See SEPIA.

INTAIL, or TAIL. See the article TAIL.

INTRANSITIVE, a grammatical term for ſuch verbs as are otherwiſe called neuter verbs. See VERB.

INVENTION. (*Dict.*) For the method of invention, ſee the article METHOD.

JOEL, or *the Prophecy of* JOEL, a canonical book of the old teſtament. Joel was the ſon of Pethuel, and the ſecond of the twelve leſſer prophets. The ſtyle of this prophet is figurative, ſtrong, and expreſſive. He upbraids the Iſraelites for their idolatry, and foretells the calamities they ſhould ſuffer, as a puniſhment of that ſin; but he endeavours to ſupport them with the comfort that their miſeries ſhould have an end, upon their reformation and repentance.

JOZO, in ichthyology, the gobius with the ventral-fins blue, and the rays of the back-fin aſſurgent. See GOBIUS.

This fiſh grows to ſix or eight inches in length, and to about an inch in diameter; the head is thick but ſomewhat compreſſed, the body rounded, the eyes large, and their iris of a ſilvery white.

IPECU, or the *Braſilian* WOOD-PECKER, in ornithology, a ſpecies of picus, with a ſcarlet creſted head. See PICUS and WOOD-PECKER.

IRBIL, or ARBELA, a town ſituated on the river Lycus, in a fine plain in the province of Aſſyria, now Curdeſtan, eaſt long. 44°, north lat. 35° 15′, where Alexander fought the third and laſt deciſive battle with Darius.

IRON, (*Dict.*) *Mill for* IRON-work. See the article SMITHERY.

IRREDUCIBLE *Caſe*, in algebra, is uſed for that caſe of cubic equations where the root, according to Cardan's rule, appears under an impoſſible or imaginary form, and yet is real. Thus in the equation, $x^3 - 90x - 100 = 0$, the root, according to Cardan's rule, will be $x = \sqrt[3]{50 + \sqrt{-24500}} + \sqrt[3]{50 - \sqrt{-24500}}$, which is an impoſſible expreſſion, and yet one root is equal to 10; and the other two roots of the equation are alſo real. Algebraiſts, for two centuries, have in vain endeavoured to reſolve this caſe, and bring it under a real form; and the queſtion is not leſs famous among them, than the ſquaring of the circle is among geometers. See EQUATION.

It is to be obſerved, that as in ſome other caſes of cubic equations, the value of the root, tho' rational, is found under an irrational or ſurd-form; becauſe the root in this caſe is compounded of two equal ſurds with contrary ſigns, which deſtroy each other; as if $x = 5 + \sqrt{5} + 5 - \sqrt{5}$; then $x = 10$; in like manner, in the *irreducible* caſe, when the root is rational, there are two equal imaginary quantities, with contrary ſigns, joined to real quantities; ſo that the imaginary quantities deſtroy each other. Thus the expreſſion: $\sqrt[3]{50 + \sqrt{-24500}} = 5 + \sqrt{-5}$; and $\sqrt[3]{50 - \sqrt{-24500}} = 5 - \sqrt{-5}$. But $5 + \sqrt{-5} + 5 - \sqrt{-5} = 10 = x$, the root of the propoſed equation.

Dr. Wallis ſeems to have intended to ſhew, that there is no caſe of cubic equations irreducible, or impracticable, as he calls it, notwithſtanding the common opinion to the contrary.

Thus in the equation $r^3 - 63r = 162$, where the value of the root, according to Cardan's rule, is, $r = \sqrt[3]{81 + \sqrt{-2700}} + \sqrt[3]{81 - \sqrt{-2700}}$, the doctor ſays, that the cubic root of $81 + \sqrt{-2700}$, may be extracted by another impoſſible binomial, *viz.* by $\frac{9}{2} + \frac{1}{2}\sqrt{-3}$; and in the ſame manner, that the cubic root of $81 - \sqrt{-2700}$ may be extracted, and is equal to $\frac{9}{2} - \frac{1}{2}\sqrt{-3}$; from whence he infers, that $\frac{9}{2} + \frac{1}{2}\sqrt{-3} + \frac{9}{2} - \frac{1}{2}\sqrt{-3} = 9$, is one of the roots of the equation propoſed. And this is true: But thoſe who will conſult his algebra, p. 190, 191, will find that the rule he gives is nothing but a trial, both in determining that part of the root which is without a radical ſign, and that part which is within and if the original equation had been ſuch as to have its roots irrational, his trial would never have ſucceeded. Beſides, it is certain, that the extracting the cube root of $81 + \sqrt{-2700}$, is of the ſame degree of difficulty, as the extracting the root of the original equation $r^3 - 63r = 162$; and that both require the triſection of an angle for a perfect ſolution. See M. de Moivre in the appendix to Saunderſon's algebra, p. 744, ſeq.

For Cardan's rule, ſee *Solution of cubic* EQUATIONS.

IRREDUCTIBLE *Caſe*, in algebra. See the article IRREDUCIBLE.

ISAMBLUCES, in natural hiſtory, the name of a genus of foſſils, of the claſs of the ſelenitæ; but of the columnar, not the rhomboidal, kind. See the article SELENITÆ.

This word expreſſes a body in form of an obtuſe or blunt column, the ſides of which are all equal to one another. This diſtinguiſhes it from the genus of the iſchnambluces, or thin columnar ſelenitæ, two of the ſides of which being broader than the others, make it of a flatted form. The ſelenitæ of this genus conſiſt of ſix ſides, and two obtuſe or abrupt ends; and all their ſides being very nearly of the ſame breadth, they much reſemble broken pieces of the columns of ſprig chryſtal. See CRYSTAL, and the next article.

The bodies of this genus, as well as the reſt of the calumnar ſelenitæ, are ſubject to a longitudinal crack, which ſometimes admitting

admitting a ſmall quantity of clay, ſhapes it into the figure of an ear of graſs. Of this genus there are only two known ſpecies; 1. a whitiſh one, very much reſembling a broken ſprig of cryſtal, found among the white tobacco-pipe clay, near Northampton. And, 2. a ſhort and pellucid one, with ſlender filaments: this is found in the ſtrata of yellow clay in Yorkſhire, and ſometimes lying on the ſurface of the earth.

ISCHNAMBLUCES, in natural hiſtory, the name of a genus of foſſils, of the claſs of the ſelenitæ; but one of thoſe which are of a columnar form, not of the common rhomboidal one. See the article SELENITÆ.

This word expreſſes a body in form of a thin or flatted column, with obtuſe ends. The characters of this genus are, that the bodies of it are of a flatted columnar form, and octohedral in figure, conſiſting of ſix long planes, and about two abrupt or broken ends: the whole being of a flatted figure. The top and bottom planes are much broader than the reſt; the four other planes, called the ſides, are narrower than theſe, but are uſually of very nearly the ſame breadth with one another, as are alſo theſe tops and bottoms, ſo that the whole figure comes very near an hexhedral priſm. The bodies of this genus very frequently have a long crack reaching their whole length; and clay often getting into this, ſpreads itſelf into the form of an ear of ſome of the graſſes, and has been miſtaken for a real ear of graſs. Of this genus there are only four known ſpecies. 1. A flat, broad, and pellucid kind, found in Northamptonſhire, Leiceſterſhire, and Yorkſhire, at conſiderably great depths in blue clay. 2. A dull rough-ſurfaced and thicker kind, found in many parts of Kent, and in great plenty in the cliffs of Sheppey-iſland. 3. A dull longitudinally ſtriated kind, found in the clay pits of Yorkſhire and elſewhere, and frequently marked in the middle with the figure of an ear of graſs. And 4. a thick, rough, and ſcaly kind, frequent on the ſhores of Sheppey-iſland, and both in the clay-pits and on the ſhores of Yorkſhire. This alſo has frequently the repreſentation of an ear of graſs.

ISINGLASS. (*Dict.*) ISINGLASS, in natural hiſtory, a name given to the white ſhining ſpecularis, with large and broad leaves; otherwiſe called muſcovy-glaſs. See SPECULARIS.

ISINGLASS FISH, the ſame with the huſo. See HUSO.

ISLAND. (*Dict.*) ISLAND or ICELAND, in geography, an iſland of Denmark, ſituated between 10 and 26 degrees weſt long. and between 64 and 67 north lat. being about 300 miles in length from eaſt to weſt; and 150 in breadth from north to ſouth.

ISLAND-*Cryſtal*, a body famous among the writers of optics, for its property of a double refraction; but very improperly called by that name, as it has none of the diſtinguiſhing characters of cryſtal, and is plainly a body of another claſs. Dr. Hill has reduced it to its proper claſs, and determined it to be of a genus of ſpars, which he has called, from their figure, parallelopipedia, and of which he has deſcribed ſeveral ſpecies, all of which, as well as ſome other bodies of a different genus, have the ſame properties. Bartholine, Huygens, and Sir Iſaac Newton, have deſcribed the body at large, but have accounted it either a cryſtal or a talc; errors which could not have happened, had the criterions of foſſils been at that time fixed; ſince Sir Iſaac Newton has recorded its property of making an ebullition with aqua fortis, which alone muſt prove that it is neither talc nor cryſtal, both thoſe bodies being wholly unaffected by that menſtruum. See the articles PARALLELOPIPEDIA, CRYSTAL and TALC.

It is always found in form of an oblique parallelopiped, with ſix ſides, and is found of various ſizes, from a quarter of an inch to three inches or more in diameter. It is pellucid, and not much leſs bright than the pureſt cryſtal, and its planes are all tolerably ſmooth, though, when nicely viewed, they are found to be moved with crooked lines, made by the edges of imperfect plates. What appears very ſingular in the ſtructure of this body, is, that all the ſurfaces are placed in the ſame manner, and conſequently it will ſplit off into thin plates, either horizontally or perpendicularly; but this is found on a microſcopic examination, to be owing to the regularity of figure, ſmoothneſs of ſurface, and nice joining of the ſeveral ſmall parallelopiped concretions, of which the whole is compoſed; and to the ſame cauſe is probably owing its remarkable property in refraction. See REFRACTION.

It is very ſoft, and eaſily ſcratched with the point of a pin; it will not give fire on

on being ſtruck againſt ſteel, and ferments, and is perfectly diſſolved in aqua fortis. It is found in Iſland, from whence it has its name; and in France, Germany, and many other places. In England fragments of other ſpars are very often miſtaken for it, many of them having in ſome degree the ſame property. See ANOMORHOMBOIDA.

ITCH. (*Dict.*) ITCH-ANIMAL, or ITCH-ACARUS, in the hiſtory of inſects, a very ſmall ſpecies of acarus, the body of which approaches to an oval and lobated figure; the head is ſmall and pointed; its colour is whitiſh, but it has two duſky, ſemicircular lines on the back; the legs are ſhort, and of a browniſh colour, and are harder than the reſt of the body, and as it were cruſtaceous. It is found in the puſtules of the itch, and is by many thought to cauſe that diſeaſe, though it is ſuppoſed if this were the caſe, it would be found more univerſally in thoſe puſtules. It is thought therefore more probable, that theſe puſtules only make a proper nidus for it. See ACARUS and ITCH.

ITEA, in botany, a genus of the *pentandria-monogynia* claſs of plants, the corolla whereof is compoſed of five long, lanceolated, acute, patent petals; the fruit is an oval capſule, of many times the length of the cup, mucronated with the ſtyle, and formed of two valves, cohering at the points; the cell is ſingle, and the ſeeds numerous and ſmall.

JUGLANS, the WALNUT-TREE, in botany, a genus of the *monoecia-polyandria* claſs of plants, the male corolla whereof being divided into ſix parts, is elliptic, equal, and plane; the female one is divided into four ſegments, acute, erect, and a little greater than the cup; the fruit is a large, dry, oval, unilocular berry, with a ſulcated kernel.

This tree grows to a very conſiderable height, and is very ramoſe, and diffuſe, from a third of its height upwards; the leaves are pinnated, and the pinnæ are obſcurely ſerrated. We have it every where in our gardens. The kernel of the walnut is ſimilar in quality to almonds; the ſhell is aſtringent, and as ſuch is made uſe of by the dyers; but neither are employed in medicine. There is an oil expreſſed from the walnut, which poſſeſſes the ſame quality with that expreſſed from linſeed and muſtard, all agreeing in one common emollient virtue. It ſoftens and relaxes the ſolids, and obtunds acrimonious humours; and thus becomes ſerviceable, internally, in pains, inflammations, heat of urine, hoarſeneſs, coughs, *&c.* in glyſters, for lubricating the inteſtines, and promoting the ejection of indurated feces; and in external applications, for tenſions, and rigidity of particular parts. It is given inwardly, from half an ounce to three ounces, or more.

JUNCO, the *reed ſparrow*, in ornithology. See SPARROW.

JUNE, the ſixth month of the year, during which the ſun enters the ſign of Cancer. See MONTH and YEAR.

In this month is the ſummer ſolſtice. See SOLSTICE.

JUSSIÆA, or JUSSIEUA, the *Catalonian Jaſmine*, in botany, a genus of the *decandria-monogynia* claſs of plants, the corolla whereof conſiſts of five roundiſh, patent petals; the fruit is oblong, thick, coronated, and opens longitudinally; the ſeeds are numerous, and diſpoſed in ſeries.

K.

KARATAS, or CARATAS, in botany, the name whereby Plumier calls the ananas. See ANANAS.

KESHITAH, in antiquity, the name of a jewiſh coin, otherwiſe called gerah. See the article COIN.

KESWICK, a market-town of Cumberland, twenty-five miles ſouth weſt of Carliſle.

KETTERING, (*Dict.*) KETTERING-STONE, in the hiſtory of foſſils, the friable pſadurium, with a round gritt, being the ſubſtance ſo much talked of in the world under this name, though it is an erroneous one, it not being found about Kettering in Northamptonſhire, but about Ketton, a ſmall town in Rutland. See STONE.

It is a very remarkable and beautiful ſtone, of a lax texture, and appears where broken of a cavernous or porous ſtructure; but this is not really the caſe, the cavities ſeen there being not originally in the ſtone, but made by falling out of the inner part of its gritt, which is uſually looſe, and falls out as ſoon as its containing ſhell is broken. It is of a duſky browniſh white colour, and is compoſed of a roundiſh gritt laid very cloſely together, and ſurrounded with a cementitious matter of a terrene ſpar. It is not only found about Ketton, but in many other parts of the kingdom; and is uſed in many places in building. See PORTLAND-STONE.

KETTON-STONE. See KETTERING-STONE.

KIDWELLY, a market-town of Caermarthen, in ſouth Wales; ſituated on the Briſtol-channel, ſeven miles ſouth of Caermarthen.

KIEL, a city of the dutchy of Holſtein, in Germany, ſituated on a bay of the Baltic ſea, fifty miles north of Hamburg, eaſt-long. 10°, north-lat. 54° 32′.

KILGARREN, a market-town of Pembrokeſhire, in ſouth Wales; ſituated twenty-five miles north of Pembroke.

KILHAM, a market-town of the eaſt riding of Yorkſhire, thirty miles north eaſt of York.

KING. (*Dict.*) KING *at arms*, or *of arms*, an officer who directs the heralds, preſides at their chapters, and has the juriſdiction of armory. See HERALD and ARMS.

There are three kings of arms in England, namely, garter, clarencieux, and norroy.

Garter principal KING *at arms*. He, among other privileges, marſhals the ſolemnities at the funerals of the prime nobility, and carries the garter to kings and princes beyond ſea, being joined in commiſſion with ſome peer of the kingdom. See the article GARTER.

Clarencieux KING *at arms*, ſo called from the duke of Clarence to whom he firſt belonged. He marſhals the funerals of baronets, knights, eſquires, and gentlemen on the ſouth ſide of the Trent. See the article CLARENCIEUX.

Norroy KING *at arms*, does the ſame on the north ſide of Trent; and theſe two laſt are called provincial heralds, as dividing the kingdom between them into two provinces.

Theſe, by charter, have power to ſet down noblemens pedigrees, diſtinguiſh their arms, appoint perſons their arms, and, with garter, direct the other heralds.

Latterly the earl marſhal of England, by ſpecial commiſſion, to perſonate the king, creates the kings at arms.

Lyon KING *at arms*, for Scotland, is the ſecond king at arms for Great-Britain; he is inveſted and ſolemnly crowned. He publiſhes the king's proclamations, marſhals funerals, reverſes arms, appoints meſſengers at arms, *&c.* See the article COLLEGE *of Heralds*.

KING *of the Romans*. See ROMAN.

KING'S EVIL, *ſcrophula* in medicine. See SCROPHULA.

KING'S SILVER, the money due to the king in the court of common-pleas, *pro licentia concordandi*, in reſpect of a licence there granted to any man, for levying a fine of lands or tenements to another perſon. See the article FINE.

KINGDOM, among chemiſts and writers of natural hiſtory, a term which they apply to each of the three orders or claſſes of natural bodies: animal, vegetable, and mineral. See BODY, ANIMAL, VEGETABLE and FOSSIL.

KNAPWEED, *Jacea*, in botany, a ſpecies of Centauria. See CENTAURIA.

KNOWLEDGE, (*Dict.*) may be uſefully diſtinguiſhed, according to Wolfius, into three kinds; hiſtorical, philoſophical, and mathematical.

Hiſtorical knowledge is merely the knowledge of facts, or of what is or happens in the material world, or within our own minds. Thus, that the ſun riſes and ſets, that trees bud in the ſpring, that we remember, will, *&c.* are inſtances of hiſtorical knowledge. Philoſophical knowledge is the knowledge of the reaſons of things, or of what is or happens. Thus he has a philoſophical knowledge of the motion of rivers, who can explain how it ariſes from the declivity of the bottom, and from the preſſure which the lower part of the water ſuſtains from the upper. So likewiſe the ſhewing how, and by what reaſon, deſire or appetite ariſes from the perception or imagination of its object, would be philoſophical knowledge. Mathematical knowledge is the knowledge of the quantity of things, that is, of their proportions or ratios to ſome given meaſure. Thus he who knows the proportion of the meridian heat of the ſun at the

the ſummer ſolſtice to its meridian heat at the winter ſolſtice, might ſo far be ſaid to have a mathematical knowledge of the ſun's heat. So likewiſe he has a mathematical knowledge of the motion of a planet in its orbit, who can diſtinctly ſhew, how, from the quantity of the impreſſed and centripetal force, the velocity of the planet is produced; and how from the action of this double force, the elliptical figure of the orbit ariſes.

Theſe three kinds of knowledge differ evidently, it being one thing to know that a thing is; another, the reaſon why it is; and a third, to know its quantity or meaſure. It is alſo evident, that hiſtorical knowledge, though extenſively uſeful, and the foundation of the reſt, is the loweſt degree of human knowledge. Thoſe who aim at the greateſt certainty ought to join mathematical with philoſophical knowledge. Nothing can more evidently ſhew that an effect ariſes from a certain cauſe, than the knowledge that the quantity of the effect is proportional to the force of the cauſe. Beſides, there are many things in nature, the reaſons of which, depending on certain figures or quantities, are not aſſignable but from mathematical principles.

Philoſophical knowledge is attended with advantages not to be expected from mere hiſtory. See PHILOSOPHY.

KOBAN-TARTARY, a part of Circaſſian Tartary, eaſtward of the ſtreights of Caffa.

KODDA-PAIL, a plant called by Linnæus piſtia. See PISTIA.

KOLA, the capital of Ruſſian Lapland, ſituated eaſt long. 32° 35′ and north lat. 69°.

KOLDING, or COLDING, a port town of Denmark, in the province of Jutland, ſituated on a bay of the little Belt, eaſt long. 9° 45′ and north-lat. 55° 30′.

KOM, or COM, a large populous city of Perſia, one hundred miles north of Iſpahan.

KOMORRA, a city of Hungary, ſituated on the Danube, at the eaſt end of the iſland Schut, eaſt long. 18° 12′, north lat. 48° 10′.

KONGEL, a port town of Sweden, in the province of Gothland, ſituated on the Categate-ſea, 12 miles north of Gottenburg.

KONINGSBURG, a city of Poland, capital of Ducal Pruſſia, and of the king of Pruſſia's Poliſh dominions, ſituated on the river Pregel, near a bay of the baltic ſea, eaſt long. 21°, north lat. 54° 40′.

KONINGSGRATZ, a city of Bohemia, ſituated on the river Elbe, eaſt long. 15° 25′, north lat. 50° 15′.

KOPPING, a town of Sweden in the province of Weſtmania, ſituated on the Meller-Lake, 54 miles weſt of Stockholm.

KOWNO, a city of Poland, in the dutchy of Lithuania, and palatinate of Troki, ſituated on the rivers Wilia and Niemen, eaſt long. 24° north lat. 55° 5′.

KUFFSTAIN, a city of Germany, in the circle of Auſtria and county of Tyrol, ſituated on the river Inn, eaſt long. 12° 12′, north lat. 47°, 32′.

KYPHONISM, in antiquity, a kind of puniſhment, otherwiſe called cyphoniſm. See CYPHONISM.

This puniſhment was inflicted three different ways; ſometimes the criminal was only tied to a ſtake; ſometimes hoiſted up into the air, and ſuſpended in a baſket; and at other times, ſtretched out on the ground. But before expoſing him, he was always ſmeared over with honey, that the gnats and flies might torment him.

KYSTIS, or CYSTIS, in anatomy. See the articles CYST and CYSTIS.

L.

LACERTA, the lizard, in zoology. See the article LIZARD.

LACINIATED-LEAF, among botaniſts, expreſſes a leaf which has ſeveral ſinuſes down to the middle, and the lobes which ſeparate theſe not ſmooth but notched, or indented at the edges. See LEAF.

LANDGRAVE, the german name for a count or earl, that has the government of a province, country, or large tract of land.

LANDGRAVIATE, or LANDGRAVATE, the office, authority, jurisdiction, or territory of a landgrave.

LAPIS. (*Dict.*) LAPIS AMPELITES. See AMPELITES.

LAPIS OBSIDIANUS, or the obsidian stone, or chian marble, of the antients, the dull, smooth, hard, black marble. See the article MARBLE.

LAPSANA in the linnæan system of botany, a plant, otherwise called zacintha. See the article ZACINTHA.

LAPWING, VANELLUS, in ornithology. See VANELLUS.

LAVATERA, in botany, a genus of the *monadelphia-polyandria* class of plants; the corolla whereof consists of five plane, patent, vertically cordated petals, growing together at the base; the fruit consists of a number of capsules; the receptacle is columnar, and affixed to the capsules; the seed is single and kidney-shaped.

LAURUS, in botany, a genus of the *enneandria-monogynia* class of plants, the corolla whereof consists of six ovato-acuminated, concave, and erect petals. The nectarium is composed of three coloured, acuminated tubercles, terminating in two hairs, and standing round the germen; the fruit is a drupe of an oval, acuminated figure, containing only one cell, and contained in the corolla; the seed is a single, ovato-acuminated nut, and its kernel is of the same figure.

This genus comprehends the laurus, or bay-tree, the cinnamon-tree, the camphire-tree, the benjamin-tree, and the sassafras-tree. See the articles CINNAMON, CAMPHOR, BENJAMIN, and SASSAFRAS.

The leaves and berries of the bay-tree, or common laurus, are only used in medicine, and are warm carminatives, and sometimes exhibited in this intention against flatulent colics; and likewise in hysterical disorders. Their principal use, in the present practice, is in glysters, and some external applications. The leaves enter our common fomentation, and the berries the plaster and cataplasm of cumin; they also give name to an electuary, which is little otherwise used than in glysters.

LAW. (*Dict.*) LAWS *of Nature*, or *Motion*, in physics, are axioms, or general rules of motion and rest, observed by all natural bodies in their actions upon one another. Of these Sir Isaac Newton has established three, which may be seen under the article MOTION.

Salic LAW. See SALIC.

LAWSONIA, in botany, a genus of the *octandria-monogynia* class of plants; the corolla whereof consists of four, plane, ovato-lanceolated, patent petals; the fruit is a globose capsule, terminating in a point, and containing four cells; the seeds are numerous, angular and acuminated.

LAWYER signifies a counsellor, or one that is learned or skilled in the law.

LEATHER. (*Dict.*) *Colouring of* LEATHER. To colour white leather, the best way. Hang the skins in chalk or lime-water, till they are grown supple, that the hair or wool may be stripped off; stretch them on tenters, or by means of lines, and smooth them over: then brush them over with alum-water very warm, and colour them with the colour you would have them, and dry them in the sun, or in some warm house, and they will be useful on sundry occasions, without any farther trouble.

To colour black-leather the German way. Take of the bark of elder two pounds, of the filings or rust of iron the same quantity; put them into two gallons of rain-water, and stop them up close in a cask or vessel, and let them stand for the space of two months: then add to that the liquid part of a pound of nut-galls, beaten to powder, and a quarter of a pound of copperas, heating them over the fire, and suffering them to stand twenty-four hours after; and then use the liquor with a brush till the skin has taken a fine black.

To colour leather a fair red. First rub the leather well in alum-water, or alum it; boil stale urine, scum it, till half of it is wasted: then put in an ounce of the finest lake, the like quantity of brazil in powder, one ounce of alum, and half an ounce of sal-armoniac; mix them well, and keep them stirring over a gentle fire about two hours, and so use the liquid part, to colour or tinge the skins.

To colour leather of a curious French yellow. Take one part of chalk, and another of wood-ashes, and make of them a good lye; then strain out the fine liquor, and set it in a vessel over the fire, and put into it turmeric in powder, and a little saffron; and let it simmer, till it becomes pretty thick; then set it a cooling, to be used as occasion requires.

To make white leather blue. Take a quart of elder-berries, strain out the juice, and boil it with an ounce of powder of alum, and half an ounce of indigo,

digo, or ſmalt-blue, and bruſh over the leather with a fine bruſh dipped in it three times, ſuffering it to dry between whiles, and the buſineſs will be effected.

To colour Spaniſh leather, *&c.* Take that which the Dutch call pomplemelch, warm it, and rub the leather with it; then take of venice tot appelen, and having pounded it ſmall, put a quantity of water to it, and let it ſoften over a gentle fire; then preſs out the water, and rub or waſh out the ſkin in it; repeating the ſame ſeveral times; and after that, take the fineſt ſhoemakers black, and rub the ſkin over with it, having in the melting added a little vitriol or copperas, and letting it dry, take gooſe or hog's greaſe, and with a woollen cloth rub the ſkin over for a good while, where there is a good fire to ſupple it, and afterwards rub it over with your hands, till it diſappear; or inſtead of greaſe, you may uſe linſeed or train-oil, and ſo in caſe of any other colour, according to the colours you deſign.

Dying of LEATHER. To dye leather of a reddiſh colour. Firſt waſh the ſkins in water, and wring them out well, and afterwards wet them with a ſolution of tartar and bay-ſalt in fair water, and wring them out again: then to the former diſſolutiou add aſhes of crab ſhells, and rub the ſkins very well with this: afterwards, waſh them in common water, and wring them out; then waſh them with tincture of madder in the ſolution of tartar and alum and the crab-ſhell aſhes; and if they prove not red enough after all, waſh them with the tincture of brazil.

To dye leather of a pure yellow. Take of fine aloes two ounces, of linſeed-oil four pounds; diſſolve or melt them; then ſtrain the liquor, and beſmear the ſkins with it, and being dry, varniſh them over.

To dye ſkins of an orange. Boil ſuſtic-berries in alum-water: but for a deep orange, uſe turmerick-root.

To dye leather blue. Boil elder-berries, or dwarf-elder in water; then ſmear or waſh the ſkins with it; wring them out: then boil the berries as before in a ſolution of alum-water, and wet the ſkins in the ſame water once or twice; dry them, and they will be very blue.

To dye leather of a pure ſky-colour. For each ſkin take indigo one ounce, put it into boiling water, let it ſtand one night; then warm it a little, and with a bruſh-pencil beſmear the ſkin twice over.

To dye leather purple. Diſſolve rock-alum in warm water, wet the ſkins with it, dry them; then boil raſped brazil well in water; let it ſtand to cool: do this three times, and afterwards rub the dye over the ſkins with your hand, and when they are dry, poliſh them.

To dye leather green. Take ſap-green and alum-water, of each a ſufficient quantity; mix and boil them a little; if you would have the colour darker, add a little indigo.

Gilding of LEATHER. Take glair of the whites of eggs or gum-water, and, with a bruſh, rub over the leather with either of them; then lay on the gold or ſilver, and letting them dry, burniſh them. See the article GILDING and BURNISHING.

To dreſs or cover leather with ſilver or gold. Take brown red, grind or move it on a ſtone with a muller, adding water and chalk, and when the latter is diſſolved, rub or lightly dawb the leather over with it, till it looks a little whitiſh, and then lay on the leaf, ſilver or gold, before the leather is quite dry, laying the leaves a little over each other, that there may not be the leaſt part uncovered; and when they have well cloſed with the leather, and are ſufficiently dried on, and hardened, rub them over with an ivory poliſher, or the fore-tooth of a horſe.

For the duties on LEATHER, ſee the articles HIDES, SKINS, *&c.*

LEDUM, the *Marſh-Ciſtus*, in botany, a genus of the *decandria-monogynia* claſs of plants, the corolla whereof conſiſts of five hollow, patent, oval petals; the fruit is a roundiſh capſule, containing five cells and opening in five places at the baſe; the ſeeds are numerous, oblong, narrow pointed at each end, and very ſlender.

LEEK. (*Dict.*) *Great-houſe* LEEK, and *tree-houſe* LEEK in botany, the Engliſh names of two different ſpecies of the ſempervivum. See SEMPERVIVUM.

LEMING, in zoology, the ſhort tailed mus, with the body variegated with black and tawny, being the ſame with the Norway-rat. See NORWAY and MUS.

LENÆA, Ληναια, in antiquity, a feſtival of Bacchus, ſurnamed Lenæus from ληνος, i. e. a vine-preſs. Beſides the uſual ceremonies at feaſts ſacred to this god, it was remarkable for poetical contentions, and tragedies acted at this time.

LEPIUM, in natural hiſtory, a genus of foſſils of the harder gypſum, compoſed of very ſmall particles, and of a leſs glittering hue. See GYPSUM.

There is only one ſpecies of this genus, being one of the leaſt valuable and moſt impure of the claſs of gypſums. It is of an extremely rude, irregular, coarſe and unequal ſtructure; a little ſoft to the touch, of a very dull appearance, and of different degrees of a greyiſh white. It is burnt in plaiſter for the coarſer works; it calcines very ſlowly and unequally, and makes but a very coarſe and ordinary plaiſter.

LEPTODECORHOMBES, in natural hiſtory, a genus of foſſils of the order of the ſelenitæ; conſiſting of ten planes, each ſo nearly equal to that oppoſite to it as very much to approach to a decahedral parallelopiped, though never truly or regularly ſo. Two of the planes in this genus, which may properly enough be called the top and bottom are ever broader and flatter than the reſt, and theſe, tho' not regularly equal, uſually anſwer one another very nearly, as do alſo the other eight in two ſets of fours. There are four ſhorter planes meeting in ſomewhat acute angles, two and two, from the ends, or two ſhorter edges of the two flat and broad rhomboidal planes, called the top and bottom; and four longer meeting in more obtuſe angles from the ſides, or longer edges of the ſame rhomboidal planes. As the broader and flatter planes, or the top and bottom, in this genus are not regularly equal to each other, ſo neither are the eight narrower to their oppoſites, but there are uſually differences both in their angles, and in the breadth of them. See the article SELENITÆ.

Of this genus there are only five known ſpecies. 1. A thin, fine, pellucid, and ſlender ſtreaked one, with tranſverſe ſtriæ, found in conſiderable quantities in the ſtrata of clay in moſt parts of England, particularly near Heddington in Oxfordſhire. 2. A thin, dull-looking, opake, and ſlender ſtreaked one, more ſcarce than the former, and found principally in Leiceſterſhire and Staffordſhire. 3. A thin fine ſtreaked one with longitudinal ſtriæ, found in the clay-pits at Richmond, and generally lying at great depths. This has often on its top and bottom a very elegant ſmaller rhomboide, deſcribed by four regular lines. 4. A rough kind with thick tranſverſe ſtriæ, and a ſcabrous ſurface, very common in Leiceſterſhire and Yorkſhire. And, 5. a very ſhort kind, with thick plates, common in the clay-pits of Northamptonſhire and Yorkſhire.

LEPTOPOLYGINGLIMI, in natural hiſtory, a name which Dr. Hill gives to a genus of foſſil-ſhells, diſtinguiſhed by a number of minute teeth at the cardo; whereof we find great numbers at Harwich-cliff, and in the marle-pits of Suſſex.

LEPTURA, in zoology, a genus of winged inſects, the antennæ whereof are oblong, ſlender and ſetaceous, the exterior wings are truncated at their extremity, and the thorax is of a ſubcylindric figure. See INSECT.

LERNEA, *the Sea-Hare*, in zoology, a ſea-inſect of the order of the gymnarthria, the body of which is of an oblong cylindric figure, and is perforated in the forehead; the tentacula reſemble ears. See GYMNARTHRIA.

LETTUCE, *lactuca*, in botany, a genus of the *ſyngeneſia-polygamia-æqualis* claſs of plants, the compound flower of which is imbricated and uniform, with numbers of equal hermaphrodite-corollulæ ſhorter than the cup; the partial corolla is monopetalous, ligulated, truncated, and quadri or quinquedentated; it has no pericarpium; the cup is connivent and ovato-cylindric; the ſeed is ſingle, ovated, acuminated and compreſſed.

The common lettuce is generally ſown for cutting very young, to mix with other ſalad herbs in ſpring; the cabbage lettuce is only this mended by culture: it may be ſown at all times of the year; but in the hot months requires to be ſown in ſhady borders. The cabbage-lettuce may alſo be ſown at different ſeaſons, to have a continuation of it through the ſummer. The firſt crop ſhould be ſown in February, in an open ſituation; the others, at three weeks diſtance, and the later ones under covert, but not under the dripping of trees. The ſileſia, imperial, royal, black, white and upright cos-lettuces, may be ſown firſt in the latter end of February or the beginning of March, on a warm light ſoil, and in an open ſituation: when the plants are come up, they muſt be thinned to fifteen inches diſtance every way; they will then require no farther care, than the keeping them clear of weeds; and the black cos, as it grows large, ſhould

have its leaves tied together, to whiten the inner part. Succeeding crops of theſe ſhould be ſown in April, May, and June, and toward the latter end of Auguſt they may be ſowed for a winter-crop, to be preſerved under glaſſes, or in a bed arched over with hoops and covered with mats.

The moſt valuable of all the Engliſh lettuces, are the white cos, or the Verſailles, the Sileſia, and the black cos. The brown Dutch and the green capuchin are very hardy, and may be ſown late, under walls, where they will ſtand the winter, and be valuable, when no others are to be had. The red capuchin Roman, and prince-lettuces, are very early kinds, and are ſown for variety, as are alſo the Aleppo-ones for the beauty of their ſpotted leaves.

The milk of the common garden-lettuces is hypnotic, while the root of the plant is cooling, diluent and nouriſhing.

LEUCOIUM, (*Dict.*) the name whereby Tournefort calls the cheiranthus of Linnæus. See CHEIRANTHUS.

LIGNICENSIS *terra*, in the materia medica, the name of a fine yellow bole, dug in many parts of Germany, particularly about Emeric in the circle of Weſtphalia, and uſed in cordial and aſtringent compoſitions. It is a common ſuccedaneum for the yellow ſileſian bole, where that is not to be had, and is generally eſteemed very nearly, if not abſolutely, equal to it in its virtues. It is moderately heavy, naturally of a ſmooth ſurface, and of a beautiful gold-colour. It eaſily breaks between the fingers, and does not ſtain the ſkin in handling, and melts freely in the mouth, but generally leaves a little grittineſs between the teeth. It makes no efferveſcence with acids; and burns not to a red, but to a pale brown, and almoſt to a ſtone hardneſs. Charlton ſays it is more frequently known by the name of terra ſigillata golthergenſis.

LINARIA, the LINNET, in ornithology. See LINNET.

LIQUIDAMBER, in botany, a genus of the *monoecia-polyandria* claſs of plants, having no corolla; the ſtamina are very numerous ſhort filaments; the calyces of the female flower are collected into a kind of globe, each conſiſting of four leaves; there is no corolla; the ſtyles are two; the fruit is compoſed of a number of oblong, bivalve unilocular capſules, formed into a globular body; the ſeeds are numerous and oblong.

This tree, which grows to a vaſt ſize, is a native of America, where a very fragrant reſin is obtained from it in great abundance.

LITHIDIA, in natural hiſtory, the name of a large claſs of foſſils, including the flint and pebble kinds. See the articles FLINT and PEBBLE.

The lithidia are defined to be ſtones of a debaſed cryſtalline matter, covered by, and ſurrounded with, an opake cruſt, and frequently of great beauty, and conſiderable brightneſs within, though of but a ſlight degree of tranſparency, approaching to the nature of the ſemi-pellucid gems, and like them found in not very large maſſes. See GEM.

The bodies of this claſs are divided into two general orders, and under thoſe into three genera. The firſt order of the lithidia contains thoſe compoſed of a cryſtalline matter, but ſlightly debaſed, and that ever by one and the ſame earth, tho' diffuſed through them in different degrees, and always free from veins. The ſecond order is of thoſe of a more debaſed cryſtalline matter, blended with different portions of differently coloured earths. Of the firſt of theſe orders there is only one genus, which is that of the common flint. Of the ſecond order there are two genera. 1. The homochroa, which are of one plain and ſimple colour; and, 2. The calculi, which are compoſed of cruſts of ſeveral different colours. Both theſe genera are compriſed under the common Engliſh name of pebbles.

LITHOGENESIA, a term uſed by ſome authors, for the formation of ſtones. See STONE.

Henkel has thrown together ſome very ingenious thoughts on this abſtruſe ſubject, in a treatiſe publiſhed in the year 1734. where he builds no opinion on any other baſis than that of facts, obſervations of nature, and experiments. He ſuppoſes that the earth was at firſt every where ſoft on the ſurface, and that this ſoft matter, by degrees, hardened, and formed ſtones of ſeveral kinds. He ſeems to imagine, that the ſurface of the earth was a ſecond time all reduced to this ſoft ſtate by the univerſal deluge at the time of Noah, and that this matter, afterwards hardening into ſtones of various kinds, included the ſhells of ſea-fiſhes, and other animal-remains of the produce of the ſeas, in flints, in lime-ſtone, or in whatever other ſubſtance the matter among which they lay chanced to harden,

den. Thus may the ſea-ſhells, found ſingly in the middle of hard flints, or lodged in vaſt numbers in the ſtrata of earth, limeſtone, or marble, be accounted for. Waters of other kinds we are very ſenſible may carry particles of ſtony matter, and lodge them ſo in other bodies, as to form complete, hard and ſolid ſtones: this is frequently done at this day in the common petrifactions of wood, and in the ſtones generated in the bladders of animals. If this be allowed a property common to ſeveral fluids, and to water in ſeveral ſtates, there is no reaſon why it ſhould be denied to have exiſted in that of the univerſal deluge; and if that be acknowledged to have had a power of forming ſtones of various kinds, there is no wonder that ſtones of various kinds ſhould be found in the ſtrata, and on the ſurface of this earth, which was all covered by that water; or that the ſtones formed in that immenſe body of water ſhould ſhew, as they do in many inſtances, the ſeveral cruſts or coats laid one upon another, by the ſucceſſive applications of the matter of which they were formed. If we conſider alſo the immenſe quantity of animal and vegetable-bodies; ſome entire, others only ſeparated into parts, which muſt have been mixed with, floating among, or lying upon the bottom of this immenſe bed of water; and that ſtones were continually forming out of this water at this time; we cannot wonder that theſe ſtones ſhould take up theſe parts of plants or animals, or concrete about them, or that we ſhould find ſhells and teeth of fiſhes, or pieces of wood, or leaves of plants preſerved in them. Nor is water alone the agent that may have made theſe changes in the once ſoft parts of the earth's ſurface; we can by fire reduce the pooreſt earths into a ſort of glaſs, a hard tranſparent body, not a little reſembling the nature of flint or the other ſemi-pellucid ſtones. Fire has a power to do great things in the bowels of the earth, and the way to learn what changes it may there make in ſtones, is to try its effects upon the ſeveral different kinds of ſtones and earths here. By experiments of this kind we learn, that of the ſeveral ſpecies of ſtones in their preſent ſtate, ſome are reduced to a friable maſs, and finally to powder, by the force of fire, others are hardened by it, others are melted, and become a kind of glaſs: and by experiments on the other foſſile-ſubſtances, it appears, that the original matter of all ſtones has been earth, either of the nature of chalk, marle, or clay; and that many of them have been greatly altered by receiving metallic or other mineral matter into their earthy matter, at the time of their formation; and all ſeem to have owed their change into their hard ſtate, either to fire alone, or to ſaline, oily, metallic, or ſaline ſulphureous matters, either conjunctly with the force of this agent, or alone.

Thoſe ſtones, which were formed in their preſent ſtate, immediately out of fluids, have been produced either by congelation, a rude coalition, or cryſtallization; and that all the gems have been once fluid, is plain from their imperfections in certain inſtances, as from their containing grains of ſand, or the like extraneons ſubſtances, firmly embodied in them. If theſe, the hardeſt of all ſtones, have been once fluid, there is no reaſon to diſpute, but that all the other kinds may have been ſo, which are leſs hard and leſs perfect.

LITHOMANTIA, Λιθομαντεια, in antiquity, a ſpecies of divination performed with ſtones. Sometimes the ſtone, called ſiderites, was uſed: this they waſhed in ſpring-water, in the night, by candle-light; the perſon that conſulted it was to be purified from all manner of pollution, and to have his face covered: this done, he repeated divers prayers, and placed certain characters in an appointed order; and then the ſtone moved of itſelf, and in a ſoft, gentle, murmur, (or as ſome ſay) in a voice like that of a child, returned an anſwer. By a ſtone of this nature, Helena is reported to have foretold the deſtruction of Troy.

LITHOMARGA, *Stone marle*, a name given by ſome authors to a ſparry ſubſtance highly debaſed by earth, which is found in great plenty in the caves of the Hart's foreſt in Germany, and uſed there in medicine, under the name of the unicornu foſſile, or foſſile unicorn's horn, from it's ſometimes emulating that figure. See the article MARLE and UNICORNU.

LITHOSTROTION, in natural hiſtory, the name of a ſpecies of foſſile-coral, compoſed of a great number of long and ſlender columns, ſometimes round, ſometimes angular, jointed nicely to one another, and of a ſtarry or radiated ſurface at their tops. Theſe are found in conſiderable quantities in the northern and weſtern parts of this kingdom, ſometimes in ſingle, ſometimes in complex ſpecimens. See the article CORAL.

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LITHOXYLUM, in botany, a term uſed by Linnæus, to expreſs a heterogeneous ſubſtance on ſea-plants, which has fructifications in impreſſed points.

LITHOZUGIA, in natural hiſtory, a genus of foſſils, of the claſs of the ſcrupi, compoſed of a ſimply ſtony matter, making a kind of cement, and holding firmly together ſmall pebbles, &c, embodied in it. See the article SCRUPI.

There are two kinds of the lithozugia. 1. That of a cryſtalline baſis and purer texture, approaching to the nature of flint, called by the engliſh lapidaries the pudding-ſtone; of this kind are reckoned four ſpecies; the yellowiſh white lithozugium, the greyiſh white lithozugium, the red lithozugium, and the browniſh lithozugium, all filled with pebbles. 2. The lithozugia of a coarſer texture, approaching to the nature of quarry-ſtone: of this kind there are alſo reckoned four ſpecies, *viz.* the freſh-coloured lithozugium, filled with reddiſh, impure, cryſtalline nodules; the bluiſh, glittering lithozugium, filled with white, impure, cryſtalline nodules; the whitiſh, green, elegant lithozugium, filled with cryſtalline nodules; and the friable, pale, red lithozugium, variegated with white veins and red nodules.

LIVONICA TERRA, in the materia medica, a kind of fine bole uſed in the ſhops of Germany and Italy, of which there are two ſpecies, the yellow, and the red; the diſtinguiſhing characters of which are theſe: the yellow livonian earth is a pure and perfectly fine bole, of a ſhattery, friable texture, conſiderably heavy, and of a dull, duſky yellow, which has uſually ſome faint bluſh of reddiſhneſs in it: it is of a ſmooth ſurface, and does not ſtain the hands; it adheres firmly to the tongue, and melts freely in the mouth, leaving no grittineſs between the teeth, and does not ferment with acid menſtrua. The red livonian earth is an impure bole, of a looſe texture, and of a pale red: it is of a ſmooth ſurface, breaks eaſily between the fingers, and does not at all ſtain the hands; it melts freely in the mouth, has a very ſtrongly aſtringent taſte, but leaves a grittineſs between the teeth, and does not ferment with acid menſtrua. Theſe earths are both dug out of the ſame pit, in the place from whence they have their name, and in ſome other parts of the world. They are gene ally brought to us made up into little cakes, and ſealed with the impreſſion of a church, and an eſcutcheon with two croſs keys. In Spain and Portugal they are much uſed, ſometimes ſingly, ſometimes mixed together, and are good in fevers and in fluxes of all kinds. The red is the more powerful aſtringent. The Spaniards and Portugueze make alſo a light kind of earthen ware of them.

LOCATELLUS's BALSAM, in pharmacy, a celebrated balſam, the preparation whereof is directed in the London diſpenſatory as follows: Take of oil-olive, one pint; Straſburg turpentine and yellow wax, each half a pound; red ſaunders, ſix drams; melt the wax over a gentle fire, with ſome part of the oil; then add the reſt of the oil and the turpentine; afterwards mix in the ſaunders, and keep them ſtirring together until the mixture is grown cold. The Edinburgh diſpenſatory directs it to be made thus: Take of yellow wax, one pound; oil-olive, a pint and a half; Venice-turpentine, a pound and a half; balſam of Peru, two ounces; dragon's blood, one ounce; melt the wax in the oil over a gentle fire; then add the turpentine, and having taken them from the fire, mix in the balſam of Peru and dragon's blood, keeping them continually ſtirring till grown cold.

This balſam is uſed in internal bruiſes and hæmorrhages, eroſions of the inteſtines, ulcerations of the lungs, dyſenteries, and in ſome coughs and aſthmas; the doſe is from two ſcruples to two drams; it may be commodiouſly exhibited along with about double its weight of conſerve of roſes: ſome have likewiſe applied it externally, for deterging and incarnating recent wounds and ulcers.

LOGARITHMIC CURVE. (*Dict.*) For which ſee plate CLXII. fig. 4.

LONGITUDE. (*Dict.*) For the method of correcting the longitude found by the dead reckoning, ſee RECKONING.

Argument of LONGITUDE. See the article ARGUMENT.

LORANTHUS, in botany, a genus of the *hexandria-monogynia* claſs of plants; the corolla whereof is formed of a ſingle leaf of a ſexangular figure, and divided into ſix nearly equal, linear, revolute ſegments; the fruit is a roundiſh unilocular berry; the ſeeds are ſix, convex on one ſide and angular on the other.

LOT, *ſors*, a portion, ſhare, or part of a thing, parcel of goods, or cargo, divided into many; alſo the condition, chance, or fortune of a perſon. See the article SORTILEGE.

LOT and SCOT. See SCOT.

LOT, or LOTH, in mining, the thirteenth diſh, meaſure, or part of the miner's ore, which the bar-maſter takes up for the king, or the farmer.

LOW-BELLS, or LOW-BELLERS, in our ſtatute-books, are perſons who go in the night-time with a light and a bell, by the ſight and noiſe whereof birds, ſitting on the ground, become ſtupefied, and ſo are covered with a net and taken.

LUMME, in ornithology, a ſpecies of colymbus, with palmated undivided feet. See the article COLYMBUS.

This is a very beautiful bird, and is extremely common in ſome particular parts of the north of Europe, though wholly unknown elſewhere: it is about equal to our common wild-duck in ſize; the head is large, and rounded at the ſides, but ſomewhat depreſſed on the crown; the eyes are large, ſharp, and piercing, and their iris of a fine pale hazel; the beak is about an inch and three quarters in length, and towards the baſe pretty thick, and of a deep gloſſy black; as are alſo the legs, which are very robuſt; the head and neck are grey; the back and wings black, but beautifully variegated with ſquare ſpots of white; and the breaſt and belly are white.

LUMP-FISH, *cyclopterus*. See the article CYCLOPTERUS.

LUNARIA, HONESTY, in botany, a genus of the *tetradynamia-ſiliculoſa* claſs of plants; the corolla whereof conſiſts of four cruciform, entire, obtuſe, large petals of the length of the cup, and ending in ungues of the ſame length; the fruit conſiſts of an elliptic, plano-compreſſed, erect, and very large pod, ſtanding upon a pedicle, terminated by a ſtyle, conſiſting of two valves, and containing two cells; the ſeeds are few, kidney-ſhaped, compreſſed, marginated, and placed in the middle of the pod.

This plant is famous in ſome parts of the kingdom for its medicinal virtues, though it has not the fortune to be received in the ſhops. The people in the northern countries dry the whole plant in the oven, and give as much as will lie on a ſhilling for a doſe, twice a day, in hæmorrhages of all kinds, particularly in the too abundant flowing of the menſes, and this with great ſucceſs. The Welſh, among whom it is not uncommon, Dr. Needham informs us, make an ointment of it, which they uſe externally, and pretend it cures dyſenteries.

LUTEOLA, in botany, the name whereby ſome authors call the reſeda of Linnæus. See the article RESEDA.

LYON, or LION, *king at arms*. See the articles KING *at arms* and COLLEGE *of heralds*.

M.

MACHLIS, or ACHLIS, in zoology, the rein-deer. See the article REIN-DEER.

MACROCERCI, in zoology, a name given to that claſs of animalcules, with tails longer than their bodies. See the article ANIMALCULE.

MACROPYRENIUM, in natural hiſtory, a genus of foſſils, conſiſting of cruſtated ſeptariæ, with a long nucleus ſtanding out at each end of the maſs. See the article SEPTARIÆ.

Of this genus there is only one known ſpecies. This is one of the moſt ſingular and extraordinary bodies of the mineral kingdom: it is of a cloſe, compact, and firm texture, of a very rugged and unequal ſurface, ever of a determinate and very ſingular ſhape, which is an oblong and cylindric figure: in ſize, it is one of the moſt determinate and regular of all the native foſſils: its length is between ſeven and eight inches, and its diameter, in the center or thickeſt part, three inches; when broken, we find it compoſed of a central nucleus, of a ferrugineous colour, naturally hollow, but commonly filled up with an earthy matter; this is incloſed in a thin cruſt of a browniſh matter, of almoſt equal hardneſs; theſe are ſurrounded with a ſingle, double, or, in ſome ſpecimens, a triple circular ſeptum, of an elegant columnar ſpar, which is again environed by two thick cruſts of a browniſh matter of the kind of the reſt of the ſeptariæ; this makes the body of the maſs, and is divided by four or five other ſepta, parting like rays from the circular

one, and making ſtraight towards the circumference of the ſtone; and the whole of this is ſurrounded with a rugged and unequal, white, browniſh coat of about one third of an inch in diameter; the cavity of the central nucleus is of half an inch diameter, and the nucleus itſelf is a very heavy body, of great hardneſs, and capable of a fine poliſh.

MACROTELOSTYLA, in natural hiſtory, a name of a genus of cryſtals, which are compoſed of two pyramids, joined to the end of a column; both the pyramids, as alſo the column, being hexangular, and the whole body conſequently compoſed of eighteen planes. See the article CRYSTAL.

MAGNITUDE. (*Dict.*) Mr. Mac Laurin obſerves, that geometrical magnitudes may be uſefully conſidered as generated or produced by motion. Thus, lines may be conceived as generated by the motion of points; ſurfaces, by the motion of lines; ſolids, by the motion of ſurfaces; angles may be ſuppoſed to be generated by the rotation of their ſides. Geometrical magnitude is always underſtood to conſiſt of parts; and to have no parts, or to have no magnitude, are conſidered as equivalent in this ſcience. There is, however, no neceſſity for conſidering magnitude as made up of an infinite number of ſmall parts; it is ſufficient that no quantity can be ſuppoſed to be ſo ſmall, but it may be conceived to be farther diminiſhed; and it is obvious, that we are not to eſtimate the number of parts that may be conceived in a given magnitude, by thoſe which, in particular determinate circumſtances, may be actually perceived in it by ſenſe, ſince a greater number of parts become ſenſible, by varying the circumſtances in which it is perceived.

For the different magnitudes of the fixed ſtars, ſee the article STAR.

MAGPY, in ornithology, a ſpecies of corvus, with a cuneiform tail. See the article CORVUS.

This is a very well-known bird, and when in full feather, and in its wild ſtate, has a great deal of beauty; the ſize is about that of the jack-daw; but its variegated wings and length of tail make it ſeem longer.

MANIS, the SCALY LIZARD, in zoology, a genus of quadrupeds, of the order of the agriæ; the body of which is covered with a kind of ſcales, and it has no ears: there is but one known ſpecies of this genus, which has been confounded with the lizards: this is an animal of great beauty, and perhaps one of the moſt ſingular in the world; its aſpect has a great ſhew of terror, but it is the moſt inoffenſive creature imaginable: its form is ſomewhat like the lizard: it is about four feet in length, and its body, in the broadeſt part, which is towards the hinder legs, is about ten inches in breadth; it is of a rounded figure on the back; the legs are ſhort, and ſtand about a foot diſtance; the reſt of the creature, from the hinder part to the extremity, is a tail, broad, thin, and between two and three feet in length; it is not connected to the hinder-part of the body, but is continuous with it: the whole upper ſurface of this creature, the back, and the outſides of the legs are covered with an armature of ſcales; the belly and inſides of the legs are naked; the ſcales are of a firm ſubſtance, and have very much the appearance of tortoiſe-ſhell; they are on the body two inches in length, and more than an inch in breadth, of an oval figure, and each terminating in a kind of ſpine; the head is ſmall, of a conic figure, about three inches in diameter at the baſe, and thence gradually growing ſmaller to the ſnout, which is ſharp and naked; the head is covered with the ſame ſort of ſcales with that of the body, only they are ſmaller; there are no teeth in the mouth, but the tongue is ten inches or more in length; the whole creature is of a brown colour; the ſtriated parts of the ſcales is of a red, duſky brown; the the ſmooth, poliſhed part has an admixture of yellow; the ſides of the body, and thoſe of the tail, are of a ſerrated form, the ſcales terminating one over another at ſome diſtance; the legs are robuſt, and the claws very ſtrong and thick; it is a native of the Eaſt-Indies and South America, lives in the woods, and feeds on inſects, as the ant-bear does, thruſting out its tongue till covered with them, and then drawing it in loaded with the food.

MARBLE. (*Dict.*) *Colouring of* MARBLE. The colouring of marbles is a nice art, and in order to ſucceed in it, the pieces of marble, on which the experiments are tried, muſt be well poliſhed, and clear from the leaſt ſpot or vein. The harder the marble is, the better it will bear the heat neceſſary in the operation; therefore

alabaſter, and the common ſoft, white marble, are very improper to perform theſe operations upon.

Heat is always neceſſary for the opening the pores of the marble, ſo as to render it fit to receive the the colours; but it muſt never be made red hot, for then the texture of the marble itſelf is injured, and the colours are burnt, and loſe their beauty. Too ſmall a degree of heat is as bad as too great; for, in this caſe, though the marble receive the colour, it will not be fixed in it, nor ſtrike deep enough. Some colours will ſtrike, even cold, but they are never ſo well ſunk in as when a juſt degree of heat is uſed. The proper degree is that which, without making the marble red, will make the liquor boil upon its ſurface. The menſtruums uſed to ſtrike in the colours muſt be varied according to the nature of the colour to be uſed. A lixivium made with horſe's or dog's urine, with four parts quick-lime, and one part pot-aſhes, is excellent for ſome colours; common lye of wood-aſhes does very well for others: for ſome, ſpirit of wine is beſt; and finally, for others, oily liquors, or common white-wine.

The colours which have been found to ſucceed beſt with the peculiar menſtruums, are theſe: Stone-blue diſſolved in ſix times the quantity of ſpirit of wine, or of the urinous lixivium; and that colour which the painters call litmouſe, diſſolved in common lye of wood-aſhes. An extract of ſaffron, and that colour made of buckthorn-berries, and called by the painters ſap-green, both ſucceed well diſſolved in urine and quick-lime, and tolerably well in ſpirit of wine. Vermillion, and a fine powder of cochineal, ſucceed alſo very well in the ſame liquors. Dragon's blood ſucceeds very well in ſpirit of wine, as does alſo a tincture of logwood in the ſame ſpirit. Alkanet-root gives a fine colour, but the only menſtruum to be uſed for this is oil of turpentine; for neither ſpirit of wine, nor any lixivium, will do with it. There is another kind of ſanguis draconis, called dragon's blood in tears, which, mixed with urine alone, gives a very elegant colour. Beſide theſe mixtures of colours and menſtruums, there are ſome colours which are to be laid on dry and unmixed. Theſe are dragon's blood, of the pureſt kind, for a red; gamboge for a yellow; green wax for a green; common brimſtone, pitch and turpentine for a brown colour.

The marble, for theſe experiments, muſt be made conſiderably hot, and then the colours are to be rubbed on dry in the lump. Some of theſe colours, when once given, remain immutable; others are eaſily changed or deſtroyed. Thus the red colour given by dragon's blood, or by a decoction of logwood, will be wholly taken away by oil of tartar, and the poliſh of the marble not hurt by it.

A fine gold-colour is given in the following manner: Take crude ſal armoniac, vitriol and verdegreaſe, of each equal quantities; white vitriol ſucceeds beſt, and all muſt be thoroughly mixed in fine powder.

The ſtaining of marble to all the degrees of red or yellow, by ſolutions of dragon's blood or gamboge, may be done by reducing theſe gums to powder, and grinding them, with the ſpirit of wine, in a glaſs mortar; but for ſmaller attempts, no method is ſo good as the mixing a little of either of theſe powders with ſpirit of wine in a ſilver-ſpoon, and holding it over burning charcoal. By this means a fine tincture will be extracted, and with a pencil dipped in this, the fineſt traces may be made on the marble, while cold, which, on the heating it afterwards, either on ſand, or in a baker's oven, will all ſink very deep, and remain perfectly diſtinct in the ſtone.

It is very eaſy to make the ground-colour of the marble red or yellow by this means, and leave white veins in it. This is to be done by covering the places where the whiteneſs is to remain with ſome white paint, or even with two or three doubles only of paper, either of which will prevent the colour from penetrating in that part. All the degrees of red are to be given to marble by means of this gum alone; a ſlight tincture of it, without the aſſiſtance of heat to the marble, gives only a pale fleſh colour, but the ſtronger tinctures give it yet deeper; to this the aſſiſtance of heat adds yet greatly; and finally, the addition of a little pitch to the tincture gives it a tendency to blackneſs, or any degree of deep red that is deſired.

A blue colour may be given alſo to marble by diſſolving turnſol in a lixivium of lime and urine, or in the volatile ſpirit of urine; but this has always a tendency to purple, whether made by the one or the other of theſe ways. A better blue, and uſed in an eaſier manner, is furniſhed by the canary-turnſol, a ſubſtance well

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known among the dyers: this needs only to be diſſolved in water, and drawn on the place with a pencil; this penetrates very deep into the marble, and the colour may be increaſed by drawing the pencil wetted afreſh ſeveral times over the ſame lines. This colour is ſubject to ſpread and diffuſe itſelf irregularly; but it may be kept in regular bounds, by circumſcribing its lines with beds of wax, or any other ſuch ſubſtance.

MARTES, the MARTIN, in zoology. See the article MARTIN.

MASTER. (*Dict.*) *Quarter*-MASTER. See the article QUARTER.

MEAN. (*Dict.*) MEAN ANOMALY, in aſtronomy. See the article ANOMALY.

MEAN { CONJUNCTION, / OPPOSITION, } in aſtronomy, is when the mean place of the ſun is in { conjunction, / oppoſition, } with the the mean place of the moon in the ecliptic. See the articles CONJUNCTION and OPPOSITION.

MEAN *diſtance of a planet from the ſun*, in aſtronomy, is the right line drawn from the ſun, to the extremity of the conjugate axis of the ellipſis the planet moves in; and this is equal to the ſemitranſverſe axis, and is ſo called, becauſe it is a mean between the planet's greateſt and leaſt diſtance from the ſun. See DISTANCE.

MEAN MOTION, in aſtronomy, that motion by a planet is ſuppoſed to move equally in its orbit, and is always proportional to the time. See the article MOTION.

MEDAL. (*Dict.*) *Impreſſions of* MEDALS. A very eaſy and elegant way of taking the impreſſions of medals and coins, not generally known, is thus directed by Dr. Shaw: Melt a little iſinglaſs-glue made with brandy, and pour it thinly over the medal, ſo as to cover its whole ſurface; let it remain on for a day or two, till it is thoroughly dry and hardened, and then taking it off, it will be fine, clear, and hard, as a piece of muſcovy-glaſs, and will have a very elegant impreſſion of the coin.

Another eaſy method is as follows: Take a perfect and ſharp impreſſion in the fineſt black ſealing-wax, of the coin or medal you deſire. Cut away the wax round the edges of the impreſſion; then with a preparation of gum-water, of the colour you would have the picture, ſpread the paint upon the wax-impreſſion with a ſmall hair-pencil, obſerving to work it into all the ſinking or hollow places, theſe being the riſing parts of the medal; and the colouring muſt be carefully taken from the other parts with a wet finger. Then take a piece of very thin poſt-paper, a little larger than the medal, and moiſten it quite through. Place it on the wax-impreſſion, and on the back of the paper lay three or four pieces of thick woollen cloth or flannel, of about the ſame ſize. The impreſſion, with its coverings, ſhould be placed between two ſmooth iron plates, about two inches ſquare, and one tenth of an inch thick. Theſe muſt be carefully put into a ſmall preſs, made of two plates of iron, about five inches and a half long, one inch and a half wide, and half an inch in thickneſs, having a couple of long male ſcrews running thro' them, with a turning female ſcrew on each, to force the plates together. Theſe being brought evenly together, by means of the ſcrews, will take off a true and fair picture of the medal; which, if any deficiences ſhould appear, may eaſily be repaired with a hair-pencil, or pen, dipped in the colour made uſe of.

If a relievo only be deſired, nothing is neceſſary, but to take a piece of card, or white paſte-board, well ſoaked in water, then placing it on the wax-mould, without any colouring, and letting it remain in the preſs for a few minutes, a good figure will be obtained.

This method of taking off medals, *&c.* is convenient, and ſeems much more ſo than the ſeveral inventions uſually practiſed in ſulphur, plaſter of Paris, paper, *&c.* wherein a mould muſt be formed, either of clay, horn, plaſter, or other materials, which requires a good deal of time and trouble.

MEDICINES. (*Dict.*) *Mechanical operation of* MEDICINES. To account for the operations of medicines mechanically, ſeems to have been the favourite ſcheme of phyſicians and phyſiologers of the laſt and preſent century. Stahl and his diſciples reject theſe accounts, and think them ſufficiently refuted by the operation of opium, and of aſtringents. One grain of opium, properly taken, will, for a time, aſſuage pains all over the body. A very few grains of crocus martis aſtringens ſometimes ſtop an hæmoptyſis, before they can be ſuppoſed to have entered into the humours of the body. Is it not paſt all belief, ſay they, that ſo few grains, mixed with ſo many pounds of fluids, ſhould retain any mechanical force, eſpecially as it is well known, that aſtringents loſe their force

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by dilution. They farther urge, that the various effects of the ſame medicine are a refutation of the mechanical hypotheſis; thus emetics ſometimes purge, and *vice verſa*; aſtringents encreaſe hæmorrhages; opium excites alacrity in ſome, inſtead of ſtupifying. Again, the ſight, or even bare imagination of ſome medicines, will produce a ſenſible effect on the body, without any contact. Stahl and his followers therefore hold, that medicines operate chiefly by exciting the vital ſenſe; and that this is the chief effect of medicines, even where they ſeem moſt to act mechanically.

Hoffman, Heiſter, and others, have attacked the hypotheſis of Stahl. We ſhall not pretend to give any farther account of the controverſy. Perhaps in this, as in others, there may be a good deal of logomachy. Strictly ſpeaking, mechanical principles muſt be inſufficient to account for the operation of medicines, as this ſometimes undoubtedly depends (in the primæ viæ at leaſt) on chemical principles; and no body has hitherto been able to account mechanically for the phænomena of chemiſtry. The laws of the minima naturæ have not hitherto been reduced to thoſe of the preſſure and impulſe of large ſenſible maſſes. And perhaps when the laws, that obtain in the minute parts of matter, have been found, we ſhall ſtill be at a loſs to account for all the phænomena of animated bodies, particularly the human.

MELINUM, in natural hiſtory, the name of an earth, famous in the earlieſt ages of painting, being the only white of the great painters of antiquity; and, according to Pliny's account, one of the three colours with which alone they performed all their works. It is a fine, white, marly earth, of a very compact texture, yet remarkably light; a ſort of texture which muſt render any earth fit for the painter's uſe, that is of a proper colour. It is frequently found forming a ſtratum in the earth, lying immediately under the vegetable mould. It is of a very ſmooth, but not gloſſy ſurface, is very ſoft to the touch, adheres firmly to the tongue, is eaſily broken between the fingers, and ſtains the ſkin in handling. It melts readily in the mouth, and is perfectly fine, leaving not the leaſt grittineſs between the teeth. Thrown into water, it makes a great bubbling and loud hiſſing noiſe, and moulders away into a fine powder. It does not ferment with acids, and ſuffers no change in the fire. Theſe are the characters by which the melinum of the antients is diſtinguiſhed from all the other white earths. It is ſtill found in the ſame place from whence the painters of old had it, which is that from whence it has its name, the iſland of Milo, called Melos by the Greeks, and is common in moſt of the adjacent iſlands. It has been of late tried here as a paint, and is found not to make ſo bright a white as the other ſubſtances now in uſe among the painters, but ſeems not liable, like them, to turn yellow; and if ſo, would be worth the conſideration of perſons in the colour trade, eſpecially as it may be had in any quantities for carriage.

MELITENSIS TERRA, *earth of Malta*, in the materia medica, an earth of which there are two very different kinds, the one of the genus of the boles, the other of the marles. The latter is that known by medicinal authors under this name; the former is the Malta earth now in uſe: but both being brought from the ſame place, are confuſedly called by the ſame name. The malteſe marle, which is the terra melitenſis of medicinal authors, is a looſe, crumbly, and very light earth, of an unequal and irregular texture, and when expoſed to the weather, ſoon falls into fine ſoft powder; but when preſerved and dried, it becomes a looſe, light maſs, of a dirty white colour, with a greyiſh caſt: it is rough to the touch, adheres firmly to the tongue, is very eaſily crumbled to powder between the fingers, and ſtains the hands. Thrown into water it ſwells, and afterwards moulders away into a fine powder. It ferments very violently with acid menſtruums.

Both kinds are found in great abundance in the iſland of Malta, and the latter has been much eſteemed as a remedy againſt the bites of venomous animals, but with how much juſtice we cannot ſay. The other has ſupplied its place in the german ſhops, and is uſed there as a cordial, a ſudorific, and aſtringent. See BOLE.

MELOE, the OIL-BEETLE, in zoology, a genus of inſects, of the order of the coleoptera; the antennæ of which are ſlender and filiform; the exterior wings are dimidiated, and there are no interior ones. See INSECT and SCARABÆUS.

MELOTHRIA, in botany, a genus of the *triandria-monogynia* claſs of plants, the corolla whereof is compoſed of a ſingle rotated petal; the tube is of the length

length of the cup, and every where grows to it; the limb is plane, and is divided into five very obtuſe ſegments, broadeſt towards the edge; the fruit is an oval, oblong body, divided within into three parts, and containing a number of oblong, compreſſed ſeeds.

In Canada, Virginia, and Jamaica, where this fruit commonly grows, it is pickled for the table.

MELTING-CONE, in aſſaying, is defined by Cramer to be a ſmall veſſel made of copper or braſs, of a conic figure, and of a nicely poliſhed ſurface within; the uſe of which is to receive melted metals, and ſerve for their precipitation, which is effected, when two bodies melted together, and yet not mixing perfectly with one another in the fuſion, ſeparate in the cooling into two ſtrata, on account of their different ſpecific gravity. See the article PRECIPITATION.

This precipitation might be made in the ſame veſſel in which the fuſion is performed; but then the melting-pot or crucible muſt be broken every time to get it out, whereas the conic ſhape, and poliſhed ſurface of this veſſel, makes it eaſily got out without any violence. The ſhape of this veſſel is alſo of another uſe in the operation; for, by means of it, the heavy matter, ſubſiding to a point, is formed into a perfect and ſeparate regulus, even where the whole quantity, as is very frequently the caſe, has been but very ſmall. When the quantity of the melted matter is great, it is common to uſe, inſtead of this cone, a large braſs or iron-mortar, or any other conveniently ſhaped braſs or iron-veſſel. It is neceſſary, when the cone is of braſs, to be cautious that it be not made too hot; for the brittleneſs of that metal, when hot, makes it eaſily break, on the ſtriking with any force on that occaſion, to make the melted maſs fall out.

Theſe, and all other moulds for the receiving melted metals, muſt always be well heated before the maſs is poured into them, leſt they ſhould have contracted a moiſture from the air, or have been wetted by accident; in which caſe the melted metal will be thrown out of them with great violence and danger. They ought alſo to be ſmeared over with tallow on their inſide, that the regulus may be the more eaſily taken out of them, and the ſurface of the mould not corroded by the melted maſs poured in. If a very large quantity of a metal is, however, to be received into them, and eſpecially, if any thing ſulphureous have place among it, this caution of tallowing the moulds does not prove ſufficient; for the large quantity of the maſs makes it continue hot ſo long, that this becomes but a ſlight defence to the ſurface of the mould. In this caſe the aſſayer has recourſe to a lute, reduced to a thin pap with water, which being applied in form of a very thin cruſt, all over the inſide of the cone, or mould, ſoon dries up indeed, but always preſerves the ſides of the veſſel from the corroſion of the maſs.

MEMBER, in architecture, denotes any part of a building; as, a frieze, corniche, or the like. This word is alſo ſometimes uſed for the moulding. See the article MOULDING.

MEMBER, in grammar, is applied to the parts of a period or ſentence. See the articles PERIOD, SENTENCE, &c.

MEMBERS, in anatomy, the exterior parts ariſing from the trunk or body of an animal.

MEMBERED, or MEMBRED, in heraldry, is where the legs or feet of an eagle, griffin, or other bird, are of a different colour from the reſt of the body.

MENISPERMUM, VIRGINIAN IVY, in botany, a genus of the *hexandria-trigynia* claſs of plants, the corolla whereof conſiſts of ſix ovato-oblong, obtuſe, hollow, erecto-patent petals; the fruit is compoſed of three oval berries, each containing a ſingle cell, and in it a large, ſingle, lunated, compreſſed ſeed.

It is to be obſerved, that the parts of fructification vary extremely in this genus.

MERGANSER, in ornithology, a ſpecies of mergus. See the article MERGUS.

MESEMBRYANTHEMUM, in botany, a genus of the *polyandria-pentagynia* claſs of plants, the corolla whereof conſiſts of a ſingle petal, with a multitude of petals of a lanceolated, narrow figure, formed into ſeveral ſeries a little longer than the cup, and cohering juſt at the baſe by their ungues; the fruit is a fleſhy, roundiſh capſule, with a radiated umbilicus, and with a number of cells equal to that of the ſtyles; the ſeeds are numerous and roundiſh. The number of ſtyles is ſometimes ten, and ſometimes they, and the ſegments of the calyx, are only four.

This genus comprehends the ice-plant, and the flowering-kali.

MESOPTERYGIOUS, in ichthyology, a term applied to ſuch fiſhes as have only one back fin, and that ſituated in the middle

middle of the back. See the article ICHTHYOLOGY.

MESSENGERS. (*Dict.*) MESSENGERS *at arms*, in the ſcottiſh polity, officers whoſe buſineſs it is to execute ſummons and letters of diligence for civil debt, real or perſonal; thus called from the impreſs of the king's arms on their blazon, being a piece of braſs or ſilver fixed upon the meſſenger's breaſt, to diſcover his warrant and authority, when he diſcharges the duty of his office; and the reſiſting him therein, is a crime, in the law of Scotland, called deforcement. See the article DEFORCEMENT.

The meſſengers at arms, of whom there are a great number, are among the officers under the lyon, who, together with his brethren the heralds, is the judge of the malverſation of meſſengers. See COLLEGE *of Heralds*, KING *at Arms*, &c.

MESUA, in botany, a genus of the *polyandria-monogynia* claſs of plants, the corolla whereof conſiſts of four large, hollow, rounded petals; the fruit is a coriaceous capſule, of a roundiſh, acuminated figure, formed of four valves, and marked with as many elate ſutures running longitudinally; the ſeeds are four, large and fleſhy, of a turbinated, triquetrous and obtuſe form.

METACARPUS, in anatomy, that part of the hand between the wriſt and the fingers. See HAND and WRIST.

The metacarpus conſiſts of four bones, which anſwer to the four fingers, whereof that which ſuſtains the fore-finger is the biggeſt and longeſt. They are all round and long, a little convex towards the back of the hand, and concave and plain towards the palm. They are hollow in the middle, and full of marrow; they touch one another only at their extremities, having ſpaces in the middle, in which lie the muſculi interoſſei. See INTEROSSEUS.

In their upper end there is a ſinus, which receives the bones of the wriſt; their lower extremity is round, and is received into the ſinus of the firſt bones of the fingers. See FINGER.

The inner part of the metacarpus is called the palm, and the other the back of the hand. See PALM.

For fractures and luxations of the metacarpus, ſee HAND, WRIST, FRACTURE, and LUXATION.

METACARPUS, ſignifies, alſo, a ſmall, very fleſhy muſcle, ſituated obliquely between the large internal annular or tranſverſe ligament of the carpus, and the whole inſide of the fourth metacarpal bone.

It is fixed by a ſmall, ſhort tendon to the os orbiculare, and to the neighbouring part of the large ligament of the carpus. From thence its fibres run more or leſs obliquely, towards the inſide of the fourth metacarpal bone; the fibres of this muſcle are of unequal lengths, and extend all the way to the articulation of the firſt phalanx of the little finger with the fourth metacarpal bone, but have no manner of relation to that finger. This muſcle ſerves to turn the fourth bone of the metacarpus towards the thumb, and at the ſame time to increaſe the convexity of the back of the hand, which is called making Diogenes's cup. The fourth bone, thus moved, carries the third along with it, by reaſon of their connexion, which ſtill augments the hollow on one ſide, and the convexity on the other.

METALLIC, or METALLINE, an adjective applied to ſomething that bears a relation to metals. See METAL and METALLURGY.

METHODISTS, a name at firſt given to a ſociety of religious young men at Oxford, and now applied to all thoſe who adhere to the doctrine of the church of England as taught by Whitefield, Weſley, *&c.* They are ſaid to be, in general, plain well-meaning people, who do not diſſent from the eſtabliſhed church; but profeſs to live with great purity, according to her articles. At their firſt appearance their teachers were charged, in the heat of their zeal, with ſeveral irregularities, and many expreſſions in their preaching which were not altogether unexceptionable; but as the civil government, with a moderation and wiſdom peculiar to the preſent time, thought fit to overlook their behaviour, they have ſince honeſtly acknowledged wherein they were miſtaken; and, in conſequence of the perfect liberty of conſcience they enjoy, have ſubſided into a more regular and peaceable conduct, agreeable to the genuine ſpirit of chriſtianity.

METHODISTS, *Methodici*, is alſo an appellation given a ſect of antient phyſicians, who reduced the whole healing art to a few common principles or appearances. See PHYSICIANS.

They were alſo called Theſſalici, as being the followers of Theſſalus. Galen ſtrenuouſly oppoſed them, and ſcrupled

not

not to affert that the methodical hereby ruined every thing good in the art of phyfic.

METHODISTS, among botanifts, Linnæus defines to be thofe perfons who have attempted the ftudy of botany upon certain principles, and have beftowed their labours upon the difpofition and arrangement of plants, and allotting them proper and diftinctive names.

MIDAS-EAR-SHELL, the fmooth ovato-oblong buccinum, with an oblong and very narrow mouth. It confifts of fix volutions, but the lower one alone makes up almoft the whole fhell. See BUCCINUM.

MILDEW, *rubigo*, a difeafe happening to plants, caufed by a dewy moifture, fuppofed by fome to be a fpecies of blight, though others make them very different. See BLIGHT.

The mildew, properly fo called, fometimes refts upon the leaves of trees in form of a fatty juice, and fometimes on the ears of corn; it is tough and vifcous to the touch, and the fun's heat drying it up, it becomes yet more vifcous and hard, and fo daubs over the young grains in the ear, that they can never after expand themfelves properly, nor grow to their due fize or weight. Bearded wheat is lefs fubject to the mildew, than the common fort; and it is obferved, that newly dunged lands are more fubject to the mildew, than others. The moft happy remedy for this is out of the farmer's power, but often happens naturally; this is a fmart fhower of rain, and immediately afterwards a brifk wind. This wholly difperfes it.

If the mildew is feen before the fun has any power, it has been recommended by many, to fend two men into the field with a long cord, each holding one end, and drawing this along through the ears, the dew will be diflodged from them before the fun's heat is able to dry it to that vifcous ftate in which it does the mifchief. Some alfo fay, that lands which have for many years been fubject to mildews, have been cured of it by fowing foot with the corn, or immediately after it.

MILK. (*Dict.*) MILK of *fulphur*. See SULPHUR.

MILL. (*Dict.*) MILL *for iron-work*. See the article SMITHERY.

Tanning-MILL. See TANNING-MILL.

MITRE-SHELL, the fmooth and flender buccinum, with a fplit roftrum. See BUCCINUM.

MOLE-CRICKET, the fame with the gryllo-talpa. See GRYLLO TALPA.

MOLYBDIA, in natural hiftory, the name of a genus of cryftals, of a cubic form, or compofed of fix faces, at right angles, like a die. See the article CRYSTAL.

Of this genus there are three known fpecies. 1. A colourlefs one, compofed of extremely fine cruits. This is found in many parts, both of this and other kingdoms, where there are lead-mines; and tho' naturally colourlefs, is fometimes tinged with a red, green, or blue. 2. A dull one with thicker cruits, fometimes whitifh, and fometimes coloured to a yellowifh or other hue. This is found in the lead-mines of Yorkfhire, and fome other places. And 3. A dull-bluifh white one, with very thick cruits. This is very frequent in the lead-mines in Derbyfhire, and is generally found in large clufters.

MONK. (*Dict.*) MONK-FISH, *fquatina*. See SQUATINA.

MORAVIANS, a fect of proteftants, who have been fettled for a confiderable time paft at Hernhuth in Germany, and have of late years fpread themfelves over moft of our American colonies, as well as in feveral parts of England, where they are permitted to fettle by a late act of parliament. They have a kind of church-government peculiar to themfelves, and are commonly known by the name of *Unitas Fratrum*, or *The Brethren*. They profefs the utmoft veneration for our bleffed Saviour, whom they conlider as their immediate Head and Director, enjoin the moft implicit obedience to the rulers of their church, and are faid to practice much brotherly love amongft one another. In fhort, they feem to be a meek, peaceable, and induftrious kind of people. They have nevertheleis been lately accufed of feveral erroneous principles and practices, to which accufations they have either been totally filent, or given partial and unfatisfactory anfwers: but as thefe may proceed more from the weaknefs and enthufiafm of particular members than the conftitution of their church itfelf, they perhaps think themfelves lefs obliged to take notice of them. It were to be wifhed, however, that they would publifh fuch a plain and diftinct account of their œconomy both in civil and religious matters, as might effectually clear them of all fufpicion of aiming at any thing inconfiftent with the

principles of the pureſt profeſſors of chriſtianity.

MORDELLA, in zoology, a genus of the coleoptera claſs of inſects, the antennæ whereof are ſlender, and have the laſt joint globoſe; moſt of the ſpecies have alſo legs, which ſerve them for leaping.

MORGAY, in ichthyology, the ſqualus with a variegated back, and with the belly-fins concreted. See SQUALUS.

The head of this ſpecies is large, and of a depreſſed form; the eyes are large, and ſtand pretty high on the ſides of the head; the noſtrils are very conſpicuous, they have each a double aperture; the mouth is on the under part of the roſtrum, and opens tranſverſely; the apertures of the gills are five, oblique, or nearly tranſverſe openings on each ſide below the heads, and reaching to the pectoral fins.

MORMYLUS, in ichthyology, the ſparus with the upper jaw longeſt, and with twelve parallel tranſverſe black lines on each ſide. See SPARUS.

MOSCHATELLINA, the *tuberous moſchatel*, in botany, Tournefort's name for the adoxa of Linnæus, a genus of the *octandria-tetragynia* claſs of plants, the corolla whereof is plain, and conſiſts of a ſingle petal, divided into four oval, acute ſegments, longer than the cup; the fruit is a globoſe berry, ſituated between the calyx and corolla; the calyx adheres to its under part; the berry is umbilicated, and contains four cells; the ſeeds are ſingle and compreſſed. This is the fructification of the terminatory flower; the lateral ones all add a fifth to the number of the parts.

MOSCHUS, the MUSK-ANIMAL, a genus of quadrupeds of the order of the pecora, having no horns; the canine teeth of the upper jaw are exerted. Of this genus there is only one known ſpecies, which is the animal that produces the perfume from which it is named. See MUSK.

This creature when full grown is three feet in length, from the tip of the noſe to the rump; the head is oblong, and the anterior part much like the greyhound; the ears are large and erect, they reſemble thoſe of the rabbit, and are equal in length to the diameter of the forehead; the tail is not more than two inches in length, and the creature always carries it erect; the body is tolerably fleſhy, and rounded; the legs about a foot in length, and very robuſt; the feet deeply divided, each into two claws in the anterior part, and as many heels behind. The fur on the head and that on the legs is about half an inch long, that on the belly is an inch and a half, and that which grows on the back three inches; theſe hairs are thicker than in any other known animal, and are variegated, from the baſe to the extremity, with diſtinct ſpaces of brown and white: the veſſel or bag in which the perfume called muſk is contained, is three inches long and two broad, and hangs under the belly, protuberating near three quarters of an inch beyond the ſurface.

MULCH, a term uſed by gardeners for rotten dung, or the like, thrown upon beds of young plants, to preſerve them from the bad effects of cold or drought.

MULTIVALVES, in natural hiſtory, the name of a general claſs of ſhell-fiſh diſtinguiſhed from the univalves, which conſiſt of only one ſhell, and the bivalves, which conſiſt of two, by their conſiſting of three or more ſhells. See SHELL, UNIVALVES, and BIVALVES.

Of theſe there are much fewer ſpecies, than either of the univalve or bivalve claſs. A late accurate French author has ranked all the ſpecies under ſix genera, which are theſe: 1. The *echini* or ſea-eggs. 2. The *vermiculi* or ſea-worms. 3. *Balani* or center-ſhells. 4. The *pollipicides* or thumb-ſhells. 5. The *conchæ anatiferæ* or gooſe-ſhells. And 6. The *pholades*.

MUNTINGIA, in botany, a genus of the *polyandria-monogynia* claſs of plants, the corolla whereof conſiſts of five roundiſh petals, of the length of the cup; they are patent, and are inſerted in the cup; the fruit is a round unilocular berry, umbilicated with the ſtigma; the ſeeds are numerous, roundiſh, and ſmall.

MURÆNA, in ichthyology, a genus of the malacopterigious claſs of fiſhes, the body of which is long, ſlender, and rounded; or ſubcylindric in ſome ſpecies: the fins are three, in others they are four, and in ſome again there is only one; at the very extremity of the roſtrum there are two ſhort tubes or foramina, one on each ſide, and theſe are the anterior apertures of the noſtrils; the branchioſtege membrane on each ſide contains ten ſlender and crooked bones, but the ſkin of the fleſh is thick and firm; ſo that till it is taken off, they are not eaſily diſcovered.

This

This genus contains the common eel, and the conger or ſea-eel. See EEL.

The other ſpecies of this genus are the ſea-ſerpent, the flat-tailed ſea-ſerpent, the ſpotted ſea-ſerpent, and the muræna ſimply ſo called. The ſea-ſerpent is the cylindric muræna, with the tail naked and acute, and has vaſtly the appearance of the ſerpent kind; it grows to five feet in length, and to the thickneſs of a man's wriſt; the head is ſmall and the roſtrum acute, but the opening of the mouth is very large, and furniſhed with a vaſt number of very ſharp and ſtrong teeth, of unequal ſizes; the eyes are ſmall, their iris of a gold-yellow, and the pupil round and black; the pectoral fins ſtand juſt at the opening of the gills, are very ſmall, and have each ſixteen rays.

The flat-headed ſea-ſerpent is the muræna, with the ſnout ſharp and ſpotted with white, and with the edge of the back-fin black; this has much the general reſemblance of the common eel, it grows to between three and four feet in length, and as thick as a man's wriſt.

The ſpotted ſea-ſerpent is the ſlender ſpotted muræna, with a pointed naked tail, growing to four feet in length, and not thicker than an eel of but two and a half. The muræna ſimply ſo called, is that with no pectoral fins, being a ſingular ſpecies, having only one fin, which is the pinna dorſi, ſurrounding the tail and running up to the anus; it grows to two feet in length, and to the thickneſs of an eel of the ſame length.

MUSCOVY-GLASS, in natural hiſtory, the white ſhining ſpecularis with large and broad leaves, otherwiſe called iſing-glaſs. See SPECULARIS.

MUSK. (*Dict.*) MUSK-HOG, *tajacu*. See TAJACU.

MUSK-ANIMAL, *Moſchus*. See the article MOSCHUS.

MUSK-*ſeed*, in botany, the Engliſh name of that ſpecies of hibiſcus, called by botaniſts the abelmoſch. See HIBISCUS.

MUSTARD, *ſinapi*, in botany. See the article SINAPI.

MUSTELA, in zoology, a genus of quadrupeds of the order of the feræ, the upper foreteeth of which are ſtraight, diſtinct, and acute; the foreteeth of the lower jaw are obtuſe and cluſtered, two of them ſtand inward; the feet are made for climbing.

This genus comprehends the gulo, the martin, the pole-cat, the weaſel, the ferret, the ermin, the ſable, the genet, the tabbied mungo, and the brown mungo. See GULO, *&c.*

MUSTELA, or the FOSSILE MUSTELA, in ichthyology, is alſo the name of the blue cobitis, with five longitudinal black lines on each ſide. See the article COBITIS.

This is a ſpecies very ſingular in its manner of living, as well as in its figure; it is five inches long, and ſomewhat more than half an inch in diameter; the head is ſhort, broad, and obtuſe; the belly is ſmooth, and of a bluiſh colour, with ten longitudinal lines running down it, five on each ſide of the back; about the mouth are placed a number of whitiſh ſlender ciiri or beards; the pectoral fins have each eleven rays, the ventral ones five, the dorſal and the pinna ani ſeven. Where the ſhores are ſandy, it will work its way under the ſand to a great diſtance from the water, and is there dug up.

MYTULUS, the *muſcle*, in natural hiſtory. See MUSCLE.

N.

NAMUR-*marble*, a name given by our artificers to a ſpecies of black marble, which is very hard, and capable of a good poliſh, but has no variegations of any other colour. It is common in Italy, France, and Germany, and is the ſpecies called the lucullean marble by the Romans. See MARBLE.

NAPLES-YELLOW, the common name in the colour-ſhops of London, and among our painters, for the ochre called Giallolino. See GIALLOLINO.

NASTURTIUM, in botany, the ſame with the lepidium. See the article LEPIDIUM.

NASUS, in ichthyology, the cyprinus with a naſiform ſnout, and fourteen rays in the pinna ani. See CYPRINUS.

NECYDALIS, in zoology, a genus of the coleoptera claſs of inſects, the antennæ of which are ſetaceous; the exterior wings are dimidiated, and there are interior or membranaceous ones.

NEEDLE. (*Dict.*) NEEDLE-FISH, a ſpecies of ſyngnathus, with the middle of the body hexangular, and the tail pinnated. See SYNGNATHUS.

The males and females of this ſpecies, as well as of the ſea-adder, another ſpecies of the ſyngnathus, are eaſily diſtinguiſhed; the females carrying a kind of long bag, reaching from the anus halfway to the tail; there are numerous eggs in this, at the proper ſeaſon they are full, of the ſize of rape-ſeed, and of a whitiſh colour; they neither are ſo numerous, nor at all reſemble in their arrangement or diſpoſition the eggs of the generality of the other fiſhes of this claſs; this may indeed be in ſome degree ſaid to be viviparous, for the rudiment of the fœtus is in ſome meaſure animated before it is diſcharged from the veſica or bag.

NEEDLE-SHELL, in natural hiſtory, the ſlender turbo, with ventricoſe ſpires, and a ſmall round mouth. See TURBO.

NEPA. (*Dict.*) NEPA, the WATER SCORPION, in zoology, a genus of four winged inſects, the roſtrum whereof is inflected, the antennæ formed into a kind of claws; the wings cruciated, and the legs four in number. This is a large inſect, near an inch in length, and about half its length in breadth; its body is a kind of elliptic form, very flat and thin, and its tail long and pointed; the body is compoſed of ſeveral joints, and the anus is remarkably large.

NEPETA, the *tall white ſideritis*, or *catmint*, in botany, a genus of the *didynamia-gymnoſpermia* claſs of plants; the corolla whereof conſiſts of a ſingle ringent petal, the tube is cylindric and incurvated, and the limb dehiſcent; the faux is patent, cordated and terminating in two ſhort ſegments; the upper lip is erect, roundiſh and emarginated; the lower one is a roundiſh, concave, large, entire and ſerrated; there is no pericarpium, but the ſeeds, which are roundiſh, and four in number, are contained in the cup.

Catmint has been greatly recommended as an uterine and nervous medicine. The people in the country ſtill frequently uſe it in form of an infuſion for theſe purpoſes, but in the ſhops it is only kept as an ingredient in ſome compoſitions.

NEREIS, in the hiſtory of ſhell-fiſh, the ſame with the ſtomatia. See STOMATIA.

NEREIS, in the hiſtory of inſects, a genus of inſects of the order of the gymnarthria, the body of which is of a cylindric figure, and the tentacula four in number, but two of them are uſually very ſhort, and often ſcarce perceptible.

NERIUM, the ROSE-BAY, in botany, a genus of the *pentandria-monogynia* claſs of plants, the corolla whereof conſiſts of a ſingle infundibuliform petal; the tube is cylindric, and ſhorter than the cup; the limb is very large and divided into five broad, obtuſe, oblique ſegments; the fruit conſiſts of two cylindric, acuminated, long, erect follicles, formed each of one valve, and opening longitudinally; the ſeeds are numerous, oblong, coronated with a downy matter, and placed in an imbricated manner.

NERVE. (*Dict.*) The antients found, that by cutting, tying or compreſſing any nerve, or any other way intercepting its communication with the brain, the parts to which it belonged were immediately deprived of all ſenſe and motion. One remarkable inſtance of this is, the making an animal dumb by tying the nerves near the wind-pipe. We read in Galen, of a boy who became quite dumb by having both the recurrent nerves divided. The experiment of cutting theſe nerves in brute animals, was repeated and confirmed by Veſalius; and Dr. Martin aſſures us, he tried it ſucceſsfully on a pig; nor did the animal recover its voice, as ſome have ſuſpected it might. As the voice depends on a proper aperture of the glottis, it ſeems likely that, when the recurrent nerves are cut, the glottis will always ſtand open, and be incapacitated from being ſhut at the will of the animal. An anonymous phyſician offers what he calls an experimentum crucis, in proof of the nerves being compoſed of cylindrical canals, containing a fluid: it is the demonſtration of the optic nerve inflated and dried, which appears canular to the naked eye. See the article EXPERIMENTUM CRUCIS.

Wounds of the NERVES. Upon the diviſion of a nerve, Heiſter obſerves, that the limb to which that nerve was extended becomes inſtantly rigid, void of ſenſation, and withers: ſo that it is no wonder that a man inſtantly expires, upon the diviſion of thoſe nerves which are ſent to the heart

or

or diaphragm: a wound alſo is attended with great danger where the nerve is only partially wounded, and not entirely divided; for the wounded fibres contract themſelves, and thoſe which remain undivided ſuffer too great an extenſion, which will bring on moſt violent pains, ſpaſms, convulſions, inflammations, and gangrenes, and ſometimes death itſelf.

NEUROPTERA, in the hiſtory of inſects, a name given to that claſs of inſects, which have membranaceous wings, with nerves and veins diſpoſed in a reliculated form in them.

NIGELLA, in botany, a genus of the *polyandria-pentagynia* claſs of plants; the corolla whereof conſiſts of five plane, oval, obtuſe, patent petals, narroweſt towards the baſe; the fruit conſiſts of as many capſules, as there were germina; which in ſome ſpecies are five, and in others ten, theſe capſules are oblong, compreſſed, acuminated, joined by an internal future, and open upwards and inwards; the ſeeds are numerous, angular and rough.

NIGHTINGALE, *luſcinia*, in ornithology, the browniſh-grey motacilla, with the annules of the knees grey. See the article MOTACILLA.

This bird is more eminent for the ſweetneſs of its note, than for its beauty; it is of the ſize of the linnet, but in ſhape it more reſembles the red-breaſt; the head is ſmall, the eyes are large, and their iris pale; the beak is duſky, ſlender, and moderately long; the head, neck and back are of a greyiſh-brown; the upper parts of the wings, and about the tail, have a tinge of reddiſh mixt with this; and the throat, breaſt and belly are of a pale whitiſh grey.

NIGHT-WALKERS, *Noctambuli*. See the article NOCTAMBULI.

NIGRICA FABRILIS, the ſame with plumbago. See PLUMBAGO.

NIPPLES. (*Dict.*) The nipples of women, in their firſt lying in, are frequently ſo ſmall, and ſunk into their breaſts, that the infant cannot get at them to ſuck its nouriſhment. Heiſter obſerves that the readieſt method in this caſe is to apply an infant ſomewhat older, and which can draw ſtronger; or, if this does not ſucceed, to let a woman who has been practiſed in the art, attempt to ſuck. When theſe do not ſucceed, it is common to have recourſe to a glaſs pipe, and the poorer people in ſome places uſually make a tobacco pipe ſerve the turn. Others apply a ſmall cucurbite made of ivory in the form of a hat, which they ſuck ſtrongly in their mouth. The common ſucking-glaſs is alſo, when properly applied, of very ſignal ſervice. To do this, the ſmall hole at the ſide is to be ſtopped with wax, and the glaſs heated with warm water; or, by holding it before the fire, ſo as to rarify, and in part, expel the air. It is then to be applied to the nipple, which, in this caſe, will not only be pulled out, but will diſcharge a large quantity of milk, ſo as to take down the inflammation and tumor in the breaſt. When the ſucking power of the glaſs is grown weak, the hole at the ſide is to be opened, and the milk poured out; the glaſs is then to be heated again, and, the hole being ſtopped again, is to be a ſecond time applied, and ſo on, till the intention is fully anſwered.

NOMOPHYLACES, Νομοφυλακες, among the Athenians, magiſtrates who were to ſee the laws executed, being not unlike to our ſheriffs. They had the execution of criminals committed to their care, as alſo the charge of ſuch as were confined priſoners. They had alſo power to ſeize thieves, kidnappers, and highwaymen, upon ſuſpicion; and, if they confeſſed the fact, to put them to death; if not, they were obliged to proſecute them in a judicial way.

NONAGESIMAL, in aſtronomy, the 90th degree of the ecliptic, reckoned from the eaſtern term, or point. See the article ECLIPTIC, *&c.*

The altitude of the nonageſimal is equal to the angle of the eaſt, and, if continued, paſſes through the poles of the ecliptic; whence the altitude of the nonageſimal, at a given time, under a given elevation of the pole is eaſily found. If the altitude of the nonageſimal be ſubſtracted from 90°, the remainder is the diſtance of the nonageſimal from the vertex. See the article ALTITUDE.

NOOSE, a name given by ſportſmen to a ſort of horſe-hair ſpringe, made to take woodcocks, and very ſucceſsful when the proper precautions are taken. The nooſe is made of ſeveral long and ſtrong hairs twiſted together, with a running nooſe at one end, and a large knot at the other, which is to be paſſed through the ſlit of a cleft ſtick, to prevent the nooſe from being pulled away when the bird is caught in it.

NORMAL, in geometry, ſignifies the ſame with a perpendicular, and is uſed

for a line or plane that interſects another perpendicularly. See the article PERPENDICULAR, SUBNORMAL, LINE and PLANE.

NORTH. (*Dict.*) NORTH-WEST *paſſage*. A north-weſt paſſage by Hudſon's bay, into the pacific ocean, has been more than once attempted of late years, but, hitherto, without ſucceſs. Some greatly doubt of the practicableneſs of ſuch an enterprize, and think the obſervations made by the Ruſſians give us ſmall hopes. But, as they have not yet publiſhed the particulars of their diſcoveries, little can be ſaid about them. Some general things may be ſeen in the Phil. Tranſ. N° 482. ſect. 14. It appears from thence, that the Ruſſians have paſſed between the land of Nova Zembla, and the coaſt of Aſia; and, as the Dutch did formerly diſcover the northern coaſts of Nova Zembla, we may now be well aſſured, that that country is really an iſland.

NOSTRILS, *Nares*, in anatomy, the two apertures or cavities of the noſe, through which the air paſſes, and which ſerve to convey odours, and to carry off the pituita ſeparated in the ſinuſes of the baſe of the cranium. See NOSE.

NOTONECTA, the BOAT-FLY, in the hiſtory of inſects, a genus of inſects of the claſs of the ſcleroptera, the roſtrum or ſnout of which is inflected, the antennæ are very ſhort; the wings, which are four in number, are cruciated, and the legs are formed for ſwimming.

NUBECULA. (*Dict.*) is alſo uſed for a matter in form of a cloud ſuſpended in the middle of the urine. See the article URINE.

NUDIPEDALIA, among the antients, a feſtival in which all were obliged to walk bare-footed. This was done on account of ſome public calamity; as the plague, famine, an intenſe drought and the like. It was likewiſe uſual for the Roman matrons, when any ſupplication and vows were to be made to the goddeſs Veſta, to walk in proceſſion to her temple bare-footed.

NUMB-FISH, the ſame with the torpedo or cramp-fiſh. See the article TORPEDO.

NUMENIUS, in ornithology, a genus of birds of the order of the ſcolopaces; the beak of which is of a figure approaching to a cylindric one, it is obtuſe at the point, and is longer than the toes, the feet have each four toes connected together.

This genus comprehends the curlew, the woodcock, the great plover, and the ſnipe. See the article CURLEW, *&c.*

NUTRITION. (*Dict.*) *Defect of* NUTRITION, or ATROPHY in medicine. See the article ATROPHY.

O.

OBSIDIANUS *Lapis*, the OBSIDIAN-STONE. See the article LAPIS.

OFFENCE, *delictum*, in law, an act committed againſt the law, or omitted where the law requires it.

Offences are diſtinguiſhed into two kinds, *viz.* ſuch as are capital, and ſuch as are not. Capital offences are thoſe for which the offender is to loſe his life. Thoſe not capital, where the offender may forfeit his lands, and goods; be fined, or ſuffer corporal puniſhment, or both, but not loſe his life. Under capital offences are comprehended high-treaſon, petit-treaſon, and felony: and offences not capital include the remaining part of the pleas of the crown, and come under the title of miſdemeanours. Some offences are puniſhable by the common law, but moſt of them by ſtatutes.

OFFICE. (*Dict.*) VICTUALLING-OFFICE, an office kept on Tower-hill, London, for the furniſhing his majeſty's navy with victuals. See NAVY.

It is managed by ſeven commiſſioners who have their inferior officers, as ſecretaries, clerks, *&c.* beſides agents in divers parts of Great Britain, Ireland, *&c.* See the article COMMISSIONERS, *&c.*

OIL. (*Dict.*) OIL-BEETLE, *Meloe*, in zoology. See MELOE.

OLD-WIFE-FISH, the name of a ſpecies of the baliſtes, with three ſpines on the back, and a forked tail. See BALISTES.

OLD WIFE, or WRASSE. See the article WRASSE.

OLI-

OLIGAEDRA, in natural hiſtory, the name of a genus of cryſtals, and expreſſes that which is compoſed of only a few planes. See the article CRYSTAL. The bodies of this claſs are cryſtals of the imperfect kind, being compoſed of columns affixed irregularly to ſome ſolid body at one end, and at the other terminated by a pyramid; but the column and pyramid being both pentangular, the whole conſiſts only of ten planes, and not, as the common kind, of twelve. Of this genus there are only three known ſpecies; 1. A whitiſh one, with a ſhort pyramid, found principally in Germany, and ſometimes brought over to us, among parcels of common cryſtal. 2. A bright and colourleſs one, with a longer pyramid. This is found in Germany, and in ſome parts of England, as in the tin mines of Cornwal, and on Mendip-hills. And, 3. A brown one, with a ſcabrous cruſt. This is produced only in the Eaſt Indies, and is well known by our lapidaries by its rough coat, and is eſteemed the fineſt of all brown cryſtals.

OMENTUM. (*Dict.*) *Falling down of the* OMENTUM. On large wounds of the abdomen, the omentum will frequently protrude itſelf through the wound, either alone, or with ſome portion of the inteſtines. When this is the caſe, the firſt buſineſs is to enquire whether the protruded part preſerves its heat, moiſture, and natural colour: if it is not found faulty in any of theſe circumſtances, it muſt be gently returned; but when the ſtraitneſs of the wound forbids this, the protruded part muſt be taken off cloſe to the wound, and the wound healed according to the common form. The omentum in this caſe will adhere to the internal part of the wound, without bringing on any diſorder, or inconvenience to the patient. But where the inteſtines fall out at the ſame time, the omentum is to be fomented, by an aſſiſtant, with warm milk and water, till the inteſtines are returned. See the article INTESTINES.

If any part of the protruded omentum be cold, dry, livid, putrid, or corrupted, the mortified part muſt be entirely cut off before the reſt is returned, leſt the neighbouring parts ſhould be brought into conſent, which would inevitably prove fatal to the patient. Heiſter directs that the corrupted part be taken off in this manner: paſs a waxed thread two or three times round the ſound part of the omentum, near the place where it is injured, and faſten it with a knot, to prevent any hæmorrhage from enſuing after the reduction of it; when you have made a ſecure ligature, take off the corrupted part with the knife, or ſciſſars, and return what is ſound, leaving, at leaſt, the length of a foot of the ligature hanging out of the wound of the abdomen, till it ſlips off from the ſound part of the omentum. The wound muſt be dreſſed in the common way, the depending part of it being kept open by a large tent: and, at every dreſſing, the ligature muſt be pulled a little gently forward, till it has, at length, entirely ſlipped off from the ſound part of the omentum.

OOZY, or OAZY *Ground*, a name given by the ſeamen to ſoft, ſlimy or muddy ground.

OPHIDION, in ichthyology, a genus of the acanthopterygious claſs of fiſhes, the body of which is long, ſubcylindric, and has three fins; the branchioſtege-membrane contains ſeven bones, they are oblong, ſlender, and ſomewhat crooked, and are with great difficulty diſtinguiſhed, unleſs the fiſh have the ſkin firſt taken off. Of this genus there are two ſpecies, *viz.* the ophidion with four beards on the lower jaw, growing to the ſize of a large eel; and the ophidion without beards, growing to about a foot and a half long.

OPHIDION, is alſo the name whereby ſome authors call that ſpecies of the ſyngnathus, commonly termed the ſea-adder.

OPHIOMANCY, Ὀφιομαντεια, in antiquity, the art of making predictions from ſerpents. Thus Calchas, on ſeeing a ſerpent devour eight ſparrows with their dam, foretold the duration of the ſiege of Troy. And the ſeven quoils of a ſerpent that was ſeen on Anchiſes's tomb, were interpeted to mean the ſeven years that Æneas wandered from place to place before he arrived in Latium. Thus, Virgil, Æn. l. 5. v. 85.

Septem enim gyros, ſeptena volumina traxit.

ORCELLE, or CANARY-WEED, in botany, a ſpecies of cladonia. See the article CLADONIA.

ORPHUS, in ichthyology, the ſparus with the tail not forked, and with a black ſpot near it. See SPARUS.

ORTY-

ORTYGOMETRA, in ornithology, a genus of birds, of the order of the ſcolopaces, the beak of which is ſhorter than the toes: it is of a compreſſed figure, and terminates in a kind of point; both the chaps are equal in length. There is but one ſpecies of this genus: it is of the ſize of our common magpye, and is a ſingular and elegant bird; the head is ſmall and oblong; the eyes are large, and their iris reddiſh, the pupil is black; the head, neck, back, and tail are of a bright and elegant brown, variegated in a beautiful manner with ſpots of black; the throat is of a pale, whitiſh grey, as are alſo the breaſt and belly.

OS. (*Dict.*) For the os calcis, os femoris, os frontis, *&c.* ſee CALCIS os, *&c.*

OSCINES, among the Romans, an appellation given to ſuch birds, from whoſe chattering or notes, omens and predictions were drawn; in which ſenſe they ſtood contra-diſtinguiſhed from the alites, or ſuch birds as afforded matters for auguries by their flight. See ALITES.

OSCITATION. See YAWNING.

OSMERUS, in ichthyology, a genus of the malacopterygious claſs of fiſhes, the back and belly fins whereof are placed at the ſame diſtance from the head; the teeth are large and ſtrong, and placed in both jaws, and alſo on the tongue and palate; the branchioſtege-membrane on each ſide has ſeven or eight rays.

This genus comprehends the ſmelt and tarantola-fiſh. See the articles SMELT and TARANTOLA.

OSMUNDA, in botany, a genus of the *cryptogamia filicum* claſs of plants, of which no part of the fructification is viſible, except the fruit: this is a globoſe, diſtinct capſule, many of which are arranged together in cluſters, and which, when mature, open horizontally, and are found to contain a great number of very minute ſeeds of an ovated ſhape.

This genus comprehends the oſmund-royal, and the moonwort.

OSTEOSPERMUM, in botany, a genus of the *ſyngeneſia-polygamia-neceſſaria* claſs of plants, the compound flower of which is radiated; the hermaphrodite corollulæ are numerous in the diſc; the female ones are about ten in the radius; there is no other pericarpium but the cup; the hermaphrodite ſeeds are abortive; the female ones are ſolitary, globoſe, coloured, and at length indurated, including a nucleus; the receptacle is naked and plane.

OTIS, the BUSTARD, in ornithology, a genus of birds, of the order of the gallinæ, the feet of which are each compoſed of three toes, all turned forward; the head is naked, or has no comb. There is but one known ſpecies of this genus: it is of the ſize of the common peacock; the head is large, as alſo the eyes; the beak is ſhort and very robuſt, and is exactly of the form of that of the common turkey; the head and neck are of a beautiful, grey colour; the back is variegated with tranſverſe ſtreaks, brown and black; the wings are ſmall, in proportion to the bulk of the body, and their principal uſe is to aſſiſt in running.

OTUS, in ornithology, a name whereby ſome writers call the leſſer horn-owl. See the articles STRIX and OWL.

OUZEL, or the *Water*-OUZEL, in ornithology, the motacilla, with a black body and white breaſt. See MOTACILLA.

OWL, in ornithology, the engliſh name of ſeveral ſpecies of the ſtrix. See STRIX. The ſeveral ſpecies of ſtrix, that fall under this denomination, are very numerous. 1. For the great horn-owl, or eagle-owl, ſee the article BUBO. 2. The black and white horn-owl, or the white aurited ſtrix, is a beautiful bird, equal to a turkey in ſize, of a ſnow-white colour, elegantly variegated with ſpots and lines of black; the head is large, round, ſhort, and decorated in a very beautiful manner, with a pair of ears or horns, as they are uſually called, being tufts of erect feathers, having their origin from the verges of the apertures of the ears. 3. The leſſer horn owl, being the ſtrix with the head aurited with ſix feathers, is another very beautiful bird, equal to a large pigeon in ſize, with very large wings; the wings are reddiſh, as is alſo the lower part of the belly and back. 4. The grey-owl, or the brown ſtrix, with a ſmooth head, with black eyes, and the primary wing-feathers ſerrated. 5. The yellow-owl, with a ſmooth head. 6. The hazel-owl, or the brown ſtrix, with a ſmooth head, and the eyes brown. 7. The yellow-eyed-owl, or the brown ſmooth-headed ſtrix, with the iris of the eyes yellow. 8. The variegated tailed owl, or the brown ſmooth-headed ſtrix, ſpotted with white, and with white faſciæ on the tail. 9. The little owl, or the brown ſtrix, with a ſmooth head, and five ſeries of ſpots on the wing feathers. This is an extremely pretty little bird, and ſo ſmall, that it appears

appears ſingular to ſee the marks of this genus on it. It is about the bigneſs of the black-bird, and its wings are very long. 10. The white-owl, or the white ſtrix, with a ſmooth head, being nearly equal to a gooſe in bigneſs. 11. The common brown-owl, or jay-owl, being the brown ſmooth-headed ſtrix, with the third of the wing-feathers longeſt, and about the ſize of a pigeon. 12. The german horn-owl, or the horn-owl with a long tail. 13. The church-owl, or the leſſer horn-owl, being the variegated-backed, ſmooth-headed ſtrix. 14. The white-beaked owl, or the ſmooth headed ſtrix, with a bluiſh, grey back, and a whitiſh beak. And, 16. The yellow-beaked american owl, or the yellow-beaked ſtrix, with a brown body, variegated with white.

OX. (*Dict.*) When theſe creatures are intended to breed, the better the land is, the larger ſort of beaſts are to be choſen, and the greater will be the profit. But of whatever ſort the breed is, the bull ſhould always be of the ſame country with the cow, otherwiſe it never ſucceeds ſo well. See BULL and COW.

The largeſt oxen are to be choſen for work, and for feeding, but then it muſt be where there is land rich enough to maintain them. When they are to draw, care muſt be taken to match them well, both for height and ſtrength; for if one be ſtronger than the other, the weakeſt will ſoon be deſtroyed. They muſt never be driven beyond their natural pace, for the beating them throws them into ſurfeits, and many other diſeaſes. The time of putting oxen to work, is at three years old; they muſt be worked gently the firſt year, eſpecially in hot weather, and fed with a large quantity of hay: this will enable them to bear their labour better than graſs; and they ſhould be always kept in a middle ſtate, neither too fat nor too lean. They may be worked till they are ten or twelve years old, and then ſold.

Diſeaſes of OXEN. As ſcarce any creature is more uſeful to man than the ox kind, nothing is more worthy conſideration than the nature and origin of their diſeaſes, and the remedies for them. The ſame diſtemper that has of late years carried off ſuch vaſt numbers of theſe cattle with us and elſewhere, has at other times raged in Italy. In the year 1710, and the ſucceeding one, there was a great mortality amongſt the horned cattle there, and the occaſion of it was evidently the unnatural ſeaſon preceding. The whole autumn before had been wet, and at the time of the winter ſolſtice there were continual cold winds, and ſmall, but laſting rains. The ſpring that ſucceeded was alſo cold and rainy, and the defect of heat, and abundance of moiſture, made a change in the whole face of nature: the medicinal ſprings had not their wonted effect; and the fruits of the earth could not appear at their proper ſeaſons, nor in their due perfection. The graſs was injured by this, and the ground rendered continually damp and unwholeſome; and to this was evidently owing the malignant and contagious diſeaſe that raged among the cattle afterwards. It was ſuppoſed at that time with them, as of late with us and elſewhere, that the contagion was brought in among their oxen by ſtrange cattle coming from infected places, but this proved to be an error; for if an ox was removed to ever ſo diſtant a paſture, he never eſcaped the better for it: the whole earth and its productions were vitiated throughout the country, and there was no ſafety in any part of it.

The uſe of this obſervation muſt be, the keeping the cattle in ſucceeding years out of the way of thoſe things which occaſion their ſickneſſes in ſuch as theſe. If the autumn or winter be extremely cold and wet, remove the cattle out of the low grounds, and put them to feed in ſandy, dry ſoils, on the high grounds; give them water from ſuch places where the ſun has moſt power, and it is leſs chilling cold than in others; and in caſes of imminent danger, always mix ſome ſalt in it. If the bad weather continues, let them always have clean ſtraw to lie on, and a dry covering; and in caſes where the contagion is already begun, the fumigating the houſes where they are kept with bay-leaves and eleutherian bark, is judged convenient. As to remedies, when they are once ſeized with the diſtemper, it is hard to underſtand what intention to preſcribe in, and how to aſcertain the doſes; and as the late practice, in attempting to cure, has been of very little ſervice, the cautions for preventing the diſeaſe ought to be redoubled, to avoid an almoſt incurable misfortune.

OXUCIÆ, in natural hiſtory, the name of a genus of foſſils of the claſs of the

ſelenitæ, but of the columnar, not the rhomboidal kind. The ſelenitæ of this genus conſiſt of ſix equal planes, having their top or bottom no broader or more depreſſed than the others; and in this differing from the iſchnambluces, or flatted columnar ſelenitæ, as they do from the iſambluces or cryſtaliform, but broken ended ones, by having their ends naturally tapering off to a point. The bodies of this genus, like thoſe of the other genera of the columnar ſelenitæ, are liable to a longitudinal crack in their middle; and this ſometimes includes a little clay, in form of an ear of graſs. See the article SELENITÆ.

Of this genus there are only two known ſpecies. 1. A fine kind, with thin flakes and tranſverſe filaments, found in the clayey banks of the river Neu, near Peterborough, in Northamptonſhire; and, 2. A dull kind, with thick plates and longitudinal filaments. This is not uncommon in Yorkſhire, and lies ſometimes in a yellow, ſometimes in a blue clay.

P

PACHODECARHOMBIS, in natural hiſtory, the name of a genus of foſſils, of the claſs of the ſelenitæ, expreſſing a thick rhomboidal body, compoſed of ten planes. See SELENITÆ.

The characters of this genus are, that the ſelenitæ of it conſiſt of ten planes; but as the top and bottom in the leptodecarhombes, or moſt common kind of the ſelenitæ, are broader and larger planes than any of the reſt, the great thickneſs of this genus, on the contrary, make its four longer planes in all the bodies of it, meeting in an obtuſe angle from its ſides, its largeſt planes. Of this genus there are only four known ſpecies. 1. A very pellucid one, with ſlender tranſverſe ſtriæ. This is frequent in the clay-pits of Northamptonſhire, and ſome other countries; and the common people have an opinion, that it is good to ſtop hæmorrhages; whence it has acquired among them the common name of ſtaunch. 2. A dull-looking kind, with very fine tranſverſe filaments. This is found in the clay-pits of Northamptonſhire, Staffordſhire, and Yorkſhire. 3. A fine and beautiful kind, with very ſlender longitudinal filaments. This is common in Yorkſhire, and ſeems almoſt peculiar to that country; it is not only found there in digging, but frequently lies on the ſurface of the earth. And, 4. A brown pellucid kind, found very frequently in Germany, and ſometimes in England.

PALATE. (*Dict.*) Wounds of the palate, and other parts of the mouth, are only to be healed by being anointed with honey of roſes, either alone, or mixed with balſam of Peru, or with oil of myrrh per deliquium.

PALLET. (*Dict.*) PALLET, in ſhip-building, is a room within the hold, cloſely parted from it, in which, by laying ſome pigs of lead, *&c.* a ſhip may be ſufficiently ballaſted, without loſing room in the hold; which, therefore, will ſerve for the ſtowing the more goods.

PANGONIA, in natural hiſtory, the name of a genus of cryſtal, conſiſting of ſuch as are compoſed of many angles. See the article CRYSTAL.

The bodies of this genus are ſingle-pointed, or imperfect cryſtals, compoſed of dodecangular or twelve-planed columns, terminated by twelve-planed pyramids, and the whole body, therefore, made up of twenty-four planes. Of this genus there are only three known ſpecies. 1. A browniſh-white one, with a long pyramid. This is found in Sileſia and Bohemia; ſometimes in mountains, and ſometimes on the ſides of rivers, and is eſteemed a very valuable cryſtal. 2. A yellowiſh-brown one, with a ſhort pyramid. This is often brought over to us under the name of ſaxon topaz, among the other cryſtals commonly known by that name. And, 3. A clear colourleſs one, with a very ſhort pyramid. This is a very valuable cryſtal, and is produced in the Eaſt-Indies, being often brought over among the indian ballaſt.

PANORPA, the SCORPION-FLY, in zoology, a genus of inſects, with membranaceous wings, the roſtrum or trunk whereof

whereof is cylindric, and of a horny ſtructure, and there is a weapon of the cheliform kind at the tail; the antennæ are ſetaceous, black, and compoſed of no leſs than thirty articulations; the back is brown; the ſides are yellow; and the wings are white.

PARABOLIC. (*Dict.*) PARABOLIC ASYMPTOTE, in geometry, is uſed for a parabolic line approaching to a curve, ſo that they never meet; yet, by producing both indefinitely, their diſtance from each other becomes leſs than any given line. Mac Laurin obſerves, that there may be as many different kinds of theſe aſymptotes as there are parabolas of different orders. See the articles PARABOLA and ASYMPTOTE.

When a curve has a common parabola for its aſymptote, the ratio of the ſubtangent to the abſciſs approaches continually to the ratio of two to one, when the axis of the parabola coincides with the baſe; but this ratio of the ſubtangent to the abſciſs approaches to that of one to two, when the axis is perpendicular to the baſe. And by obſerving the limit to which the ratio of the ſubtangent and abſciſs approaches, parabolic aſymptotes of various kinds may be diſcovered.

PARALLELOPIPEDIA, in natural hiſtory, the name of a genus of ſpars, thus called, becauſe regularly of a parallelopiped form. See the article SPAR.

They are pellucid cryſtaline ſpars, externally of a determinate and regular figure, always found looſe, detached, and ſeparate from all other bodies, and in form of an oblique parallelopiped, with ſix parallelogram ſides and eight ſolid angles, eaſily fiſſile, either in an horizontal or perpendicular direction, being compoſed of numbers of thin plates, and thoſe of very elegantly and regularly arranged bodies, each of the ſame form with the whole maſs, except that they are thinner in proportion to their horizontal planes; and naturally fall into theſe and no other figures, on being broken with a ſlight blow. Of this genus there are four known ſpecies. 1. The hard, pellucid, and colourleſs one, called the iſland-cryſtal of authors. See the article ISLAND-CRYSTAL.

2. A dull and whitiſh kind, found in France, Germany, and England, particularly in the Derbyſhire and Yorkſhire lead-mines, and about Scarborough. This has the ſame property with the former, of giving a double refraction; but it is ſo dull and opake, that it does not ſhew it ſo elegantly. 3. A ſoft, whitiſh, and very bright one, found principally in the lead-mines of Yorkſhire, and about the ſea-ſhores of that country. And, 4. A dull, hard, and pale-brown one: this is found in the lead-mines of the ſame country, and in ſome parts of Ireland. All theſe ſpecies have the ſame power of double refraction with the firſt, but are too opake to ſhew it ſo beautifully, and often have not tranſparency enough to make it at all diſtinguiſhable.

PARAMECIA, in natural hiſtory, a name given to ſuch animalcules as have no viſible limbs or tails, and are of an irregularly oblong figure. See the article ANIMALCULE.

PAREMBOLE, Παρεμβολη, in rhetoric, a figure wherein ſomething relating to the ſubject is inſerted in the middle of a period. All the difference between the parembole and parentheſis, according to Voſſius, is, that the former relates to the ſubject in hand, whereas the latter is foreign to it. An example of each we have in Virgil; and firſt of the parembole.

Æneas (neque enim patrius conſiſtere mentem
Paſſus amor) rapidum ad naves præmittit Achatem.

The following is an inſtance of the parentheſis:

——ipſique ſuos jam morte ſub ægrâ
(Di meliora piis, erroremque hoſtibus illum)
Diſciſſos nudis laniabant dentibus artus.

See the article PARENTHESIS.

PARETONIUM, in natural hiſtory, the name of an earth antiently found on the ſhores of Egypt, Cyrene, and the iſland of Crete, and uſed by the antients in painting. There has been ſome difference among the earlier writers about the nature and origin of this ſubſtance, and of late we have been taught to think it loſt; but it is ſtill common on the ſhores of moſt of the iſlands of the Archipelago, though not obſerved or regarded; and is truly a very heavy and tough clay, of a fine white colour, found in maſſes of different ſizes, generally as ſoft as the ſofter clays within the ſtrata; and by rolling about on the beech in this ſtate, it gathers up the ſand, ſmall ſhells, and other foulneſſes we always find about it. It is moſt probable, that there are

ſtrata of it fine and pure in the cliffs there, and that the ſea waſhes off maſſes of them in ſtorms and high tides, which are what we find.

PARTITION. (*Dict.*) PARTITION, in rhetoric, the ſame with diviſion. See the article DIVISION.

PARTITION, in muſic, the diſpoſition of the ſeveral parts of a ſong ſet on the ſame leaf, ſo as upon the uppermoſt ranges of lines are found the treble; in another, the baſs; in another, the tenor, *&c.* that they may be all ſung or played, either jointly or ſeparately. See the articles PART, MUSIC, *&c.*

PARTITION, in architecture, that which divides or ſeparates one room from another. See the article BUILDING.

PARTITION, in heraldry. See the article QUARTERING.

PARTITIONE FACIENDA, in law, a writ which lies for thoſe who hold lands or tenements pro indiviſo, and would ſever to every one his part, againſt them that refuſe to join in partition, as co-partners.

PARTNER. (*Dict.*) PARTNERS, in a ſhip, are ſtrong pieces of timber bolted to the beams incircling the maſts, to keep them ſteady in their ſteps, and alſo keep them from rolling, that is, falling over the ſhip's ſides. There are alſo of theſe partners at the ſecond deck, to the ſame end; only the mizzen-maſt hath but one pair of partners, in which that maſt is wedged ſo firm that it cannot move. Some ſhips do not ſail well, unleſs their maſts are looſe, and have leave to play in the partners; but in a ſtorm this is dangerous, leſt the partners ſhould be wronged, (as they ſay) *i. e.* forced out of their places; for then there is no help but to cut the maſt by the board.

PARUS, the TITMOUSE, in ornithology. See the article TITMOUSE,

PATELLA, (*Dict.*) in anatomy. *Fracture of the* PATELLA. The patella, or knee-pan, is much more ſubject to a tranſverſe fracture than to one in any other direction. The longitudinal fracture of this bone happens more rarely, but when it does, is much more eaſily cured; becauſe the fragments of the bone, in this caſe, generally keep in their right places, but when the bone is broken not only tranſverſely, but into ſeveral pieces, the caſe is yet more difficult and dangerous. The cure of this fracture, according to Heiſter, muſt be attempted in this manner: in a longitudinal or perpendicular fracture, the patient muſt be laid upon his back, and, extending the foot, the ſurgeon muſt replace the fragments on both ſides with the preſſure of his hands, binding them up carefully with the uniting bandage; which muſt be applied in this caſe in the ſame manner with that uſed in large wounds in the belly or forehead. But when the patella is broken tranſverſely, or into ſeveral pieces, the patient being laid in the ſame poſture, and extending his foot as before, the ſurgeon is with great care to endeavour with the palms of both his hands, aſſiſted by his fingers and thumbs, to bring together and replace the fragments in their natural ſituation; and when that is done, they muſt be retained firmly together, by means of a plaſter made in form of a half moon, or properly perforated, and then the foot and leg are to be bound up, and placed ſo that they cannot be eaſily moved: but to prevent the bone from being diſplaced again, the patient muſt not uſe his leg till after the ninth or tenth week. See the article FRACTURE.

PATELLA *luxated.* The patella is moſt uſually luxated either on the internal or external ſide of the joint, though phyſicians give accounts of its being ſometimes luxated both above and below it. Whenever the knee itſelf is perfectly luxated, the patella can ſcarce avoid being diſplaced at the ſame time, becauſe of its ſtrong connection to the thigh and to the tibia. See the article KNEE.

The reduction of a luxated patella is uſually no great difficulty. The patient is to be laid flat on his back upon a table or bed, or upon an even floor, ſo that his leg may be pulled out ſtraight by an aſſiſtant; when this is ſufficiently extended, the ſurgeon muſt graſp the patella with his fingers, and afterwards, by the aſſiſtance of his hand, preſs it ſtrongly into its proper place. This may be alſo poſſibly effected while the patient ſtands upright: when this is done, there remains nothing but carefully to bind up the part, and let the patient reſt for ſome days; ſometimes gently binding and extending his leg in the mean while, that it may not become ſtiff.

PEBBLES, (*Dict.*) the name of a genus of foſſils, diſtinguiſhed from the flints and homochroa, by their having a variety of colours. Theſe are defined to be ſtones, compoſed of a cryſtalline matter, debaſed

debaſed by earths of various kinds in the ſame ſpecies, and then ſubject to veins, clouds, and other variegations; uſually formed by incruſtations round a central nucleus, but ſometimes the effect of a ſimple concretion, and veined like the agates, by the diſpoſition the motion of the fluid they were formed in gave their differently coloured ſubſtances. Dr. Hill obſerves, that the variety of pebbles, were it of England alone, is ſo great, that a haſty deſcriber would be apt to make almoſt as many ſpecies as he ſaw ſpecimens. A careful examination will teach us, however, to diſtinguiſh them into a certain number of eſſentially different ſpecies, to which all the reſt may be referred, as accidental variations. When we find the ſame ſubſtances and the ſame colours, or thoſe reſulting from a mixture of the ſame, ſuch as nature frequently makes in a number of ſtones, we ſhall eaſily be able to determine, that theſe are all of the ſame ſpecies, though in different appearances; and that whether matter be diſpoſed in one or two, or in twenty cruſts, laid regularly round a central nucleus, or thrown without a nucleus into irregular lines, or, finally, blended into a ſort of uniform maſs.

Theſe are the three ſtates in which we are liable to find every ſpecies of pebble; for if it have been moſt naturally and regularly formed by incruſtation round a central nucleus, we find that ever the ſame in the ſame ſpecies, and the cruſts not leſs regular and certain. If the whole have been more haſtily formed, and have been the reſult only of one ſimple concretion, if that has happened while its different ſubſtances were all moiſt and thin, they have blended together and made a mixed maſs of the joint-colour of them all; but if they have been ſomething harder when this has happened, and too far concreted to diffuſe wholly among one another, they are found thrown together in irregular veins. Theſe are the natural differences of all the pebbles; and having regard to theſe in the ſeveral variegations, all the known pebbles may be reduced to thirty-four ſpecies; for an account of each, we refer the curious to Hill's hiſtory of foſſils, p. 512, ſeq.

There are many people of opinion, that the ſwallowing of pebbles is very beneficial to health, in helping the ſtomach to digeſt its food; and a pebble-poſſet is an old woman's medicine in the colic in many parts of England. They uſually order the ſmall white-ſtones to be picked up out of gravel-walks for this purpoſe, and eat them in large quantities in ſome ſort of ſpoon-meat, of which milk is an ingredient: however this cuſtom may ſtill prevail, we have no phyſician's practice to warrant it, and could produce inſtances of much miſchief reſulting from ſwallowing of pebbles; a remarkable one whereof the reader may find recorded in the philoſophical tranſactions, n° 253.

PEEVIT, or BLACK-CAP, in ornithology, the grey larus, with a black head. See the article LARUS.

This is a very elegant ſpecies: its ſize is about that of the common tame pigeon; the head is ſmall; and the eyes bright, their iris is of a pale, hazel colour; the verges of the eye-lids are red, and they are ſurrounded with a fine, white plumage; the beak is nearly an inch in length, it is of a fine, bright ſcarlet, and is a little bent downwards; the legs are ſlender; their colour is a blood-red; the claws are black, and the toe behind is very ſhort and ſmall.

PENTAEDROSTYLA, in natural hiſtory, the name of a genus of ſpars. See the article SPAR.

The bodies of this genus are ſpars, in form of pentangular columns, terminated by pentangular pyramids at one end, and irregularly affixed at the other to ſome ſolid body.

Of this genus there are three known ſpecies. 1. One with a very long pyramid. This is found in the mines on Mendip-hills. 2. One with a thick column, and a very ſhort and large pyramid. This is found in the Hartz-foreſt in Germany, and in Cumberland. And, 3. One with a broad depreſſed pyramid. This is found, ſo far as it is yet known, only in the mines at Rammelſberg in the Hartz-foreſt in Germany.

PENTELASMIS, in the hiſtory of ſhell-fiſh, a genus of animals, compoſed of a fleſhy body, affixed to a fleſhy and ſoft pedicle; the body is compoſed of five valves, and the pedicle is ſometimes ſhort, and in other ſpecies conſiderably long. The animal, inhabiting the ſhell-body of this genus, is a triton. See the article TRITON.

This genus comprehends the gooſe-ſhell, or barnacle, being a tender, brittle ſhell, about an inch long, and three quarters of

of an inch in diameter. See the article CONCHA ANATIFERA.

PEPPER. (*Dict.*) PEPPER-EEL, in the hiſtory of animalcules, a ſpecies of enchelis, found in pepper-water and other vegetable infuſions. See ENCHELIS and PEPPER-WATER.

PERSPICUITY, *perſpicuitas*, in rhetoric, is a principal virtue of ſtyle, to which all the ornaments and beauties of ſpeech ought to give way. See STYLE.

Voſſius obſerves, that a diſcourſe is obſcured by too much conciſeneſs and profuſeneſs; ſeveral rhetorical figures are likewiſe deſtructive of perſpicuity.

PETRIDIA, in natural hiſtory, a genus of ſcrupi, of a plane, uniform ſtructure, of no great variety of colours, and emulating the external form of pebbles. See the article SCRUPI.

Dr. Hill deſcribes no leſs than twelve ſpecies of this genus. 1. The various-ſized, pellucid, colourleſs, cryſtalliform petridium, commonly called the pebble-cryſtal. 2. The purple, ſemipellucid, cryſtalline petridium. 3. The ſnow-white, opake, cryſtalline petridium. 4. The opake, whitiſh, reddiſh, or yellowiſh, cryſtalline petridium, commonly called red, white, and yellow, ſparry pebbles. 5. Yellowiſh, white, pumicoſe, or ſpungy petridium. 6. Hard, porous, whitiſh, cryſtalline petridium. 7. Greyiſh, white, opake, ſtony petridium. 8. Friable, ſhining, white, arenaceous petridium. 9. White, cryſtalline petridium, ſpotted with ſmall yellow dots. 10. Whitiſh-brown, dull petridium. 11. Bluiſh, white, hard, cryſtalline petridium. And, 12. Browniſh, white, hard, ſhining petridium.

PETTREL, in ornithology, a name for the procellaria, or ſtorm-bird. See the article PROCELLARIA.

PHALÆNA, in the hiſtory of inſects, a genus of inſects, of the order of the lepidoptera, the antennæ whereof are attenuated to the point, not clavated: the ſpecies of this genus are very numerous; ſome of them have the antennæ of a priſmatic form; ſome have them pectinated, or made in faſhion of a comb, and of theſe laſt, ſome have no tongue, and others have a ſpiral one; ſome have the antennæ pectinated, and ſit with the wings flat or plane; others ſit with the wings plane and patent, and have ſimple antennæ and a ſpiral tongue; ſome have the antennæ ſimple, and the tongue ſpiral, but do not ſit with the wings plane, and of theſe ſome have the forehead prominent, others not; others again have the antennæ ſimple, and have no tongue.

PHASIANUS, the PHEASANT, in ornithology. See PHEASANT.

PHASSACHATES, in natural hiſtory, the name of a ſpecies of agate, which the antients, in its different appearances, ſometimes called alſo leucachates and perileucos. See the article AGATE.

The ſame agate, from the various proportion or manner of admixture of its particles in different ſpecimens, often makes a very different figure; but no ſpecies is ſo liable to remarkable diverſities of this kind as this. It is but of a ſmall variety of colours, yet is often very beautiful: its ground or baſis is always a pale, bluiſh grey, approaching to what we call a lead-colour or dove-colour. Sometimes it is equally and evenly of this colour, thro' the whole maſs: but often alſo it is variegated within with veins of a deep black, and of a pure and clear white: theſe ſometimes approach the ſurface of the ſtone, but more uſually they are only near the center; and they are almoſt always diſpoſed in concentrical, but irregular circles, round one, two, or more points. The pieces of this ſtone, cut where there are many of theſe veins, much reſemble parts of onyxes.

It is found in the Eaſt-Indies, and in Bohemia, and ſome other parts of Europe. When the whole matter of the veins and baſis of this ſtone are all blended together into one equal maſs, as is frequently the caſe both with this and many other of the naturally veined ſtones, the whole becomes of a deeper greyiſh blue, or a dove-colour, and is then the phaſſachates; when the veins are kept diſtinct and clear, it is the leucachates and perileucos, agreeing with all the deſcriptions of the antients.

PHILYCA, in botany, a genus of the *pentandria-monogynia* claſs of plants, the corolla whereof conſiſts of a ſingle, imperforated, erect petal, rude upon the outſide; the tube is of a conic form, and of the length of the perianthium; and the limb is quinquefid, erect, and ſmall; the fruit conſiſts of a roundiſh, trilobous, trilocular, and trivalvar capſule; and the ſeed is ſingle, roundiſh, gibbous on one ſide, and angulated on the other.

PHLEBOTOMY. (*Dict.*) In bleeding in the eyes, there are ſeveral ways of perform-

performing the operation, but the beſt, in Heiſter's opinion, is the following. The patient being ſeated on a chair, and his head held in a proper poſture, a tranſverſe inciſion is to be made, with a fine lancet, upon the turgid ſmall veins in the corners of the eye, ſo as to open them or cut them quite aſunder. The eye-lids muſt be held apart with one hand, whilſt the veins are opened with the other; and ſome uſe a pair of fine ſciſſars for this purpoſe, inſtead of a lancet, and others elevate the veins with a crooked needle before they divide them; but in this operation the better way would be to make the needles with edges, that when the veins were thus elevated, they might divide them without the help of any other inſtrument. When the inciſion is made, the diſcharge of blood muſt be promoted by means of fomentation, with a ſponge dipped in warm water; and if the diſcharge is not ſufficient, the inciſion may be repeated two or three times: but few patients can be brought to ſuffer this, and there is no practiſing it at all upon infants, becauſe they will not keep the eye ſteady.

PHRENITIS, or PHRENSY, in medicine. See the article PHRENSY.

PHRYGANEA, in zoology, a genus of inſects of the order of the neuroptera, the palate whereof is prominent, with two tentacula on each ſide; the wings are incumbent; and the worm of it lives under water in a kind of caſe.

PHYSETER, (*Dict.*) in ichthyology, is alſo the name of a genus of fiſhes of the order of the plagiuri, having teeth only in the lower jaw that are crooked; on the back there is a fin, or a large and tall ſpine; and the opening or fiſtula for the diſcharge of the water is in the front part of the head. See PLAGIURI.

This genus comprehends the crooked-toothed whale, and the plane-toothed whale. See the article WHALE.

PIACE, SE PIACE, or AD LIBITUM, in the italian muſic, ſignifies, that the part it is joined to may be repeated or not, at pleaſure.

PICÆ, in ornithology, a claſs of birds, which have the beak convex and compreſſed.

This claſs comprehends ſeveral genera; as, the ramphaſtos, buceros, corvus, picus, *&c.* See RAMPHOSTOS, *&c.*

PICRIS, *langue de beuf*, in botany, a genus of the *ſyngeneſia-polygamia-æqualis* claſs of plants, the compound flower of which is imbricated and uniform, with equal and numerous hermaphrodite corollulæ; the partial flower is monopetalous, ligulated, lineated, truncated, and quinquedentated; there is no pericarpium; the ſeed, which is contained in the cup, is ſingle, ventricoſe, obtuſe, and crowned with a plumoſe pap.

PICUS, the WOOD-PECKER, in ornithology. See the article WOOD-PECKER.

PINACIA, *πινακια*, among the Athenians, tablets of braſs, whereon the names of all the perſons in each tribe duly qualified, and willing to be judges or ſenators of the areopagus, being ſeverally written, they were caſt into a veſſel provided on purpoſe; and into another veſſel were caſt the ſame number of beans, an hundred of which were white, and all the reſt black. Then the names of the candidates and the beans were drawn one by one; and thoſe, whoſe names were drawn out together with the white beans, were received into the ſenate. See the article AREOPAGUS.

PIPER. (*Dict.*) PIPER, in ichthyology, a ſpecies of trigla, with a bifid roſtrum, and tubuloſe noſtrils. See TRIGLA.

The head of this ſpecies is very large in proportion to the body; the mouth is remarkably wide; the eyes are large, and ſtand at a very ſmall diſtance from each other at the top of the head, and are covered with a ſkin; the bony covering of the head is angulated, and terminates in two horns at the hinder part; the roſtrum is formed into ſpines, and at the upper part of the orbits of the eyes there is alſo a robuſt and crooked ſpine; the body is ſomewhat rounded, and of a conic figure, very large towards the head, and extremely ſmall at the tail; over each of the pectoral fins there ſtands a very robuſt and ſharp thorn, and there are on each ſide three articulated appendages: this fiſh grows to more than a foot in length; and, when caught, it makes a ſingular and loud noiſe.

PIT *of a theatre*, all that ſpace between the amphitheatre or galleries, and theatre or ſtage, called by the antients orcheſtra. See the article ORCHESTRA.

Brine-PITS, the name given by the people of Worceſterſhire and Cheſhire to the wells or pits affording ſalt water, out of which they extract the ſalt. See SALT.

PLACAGNOSCIERIA, in natural hiſtory, the name of a genus of ſpars. See SPAR.

The

The bodies of this genus are dull and opake, cryſtalline, terrene ſpars, formed into cruſts, and of an irregular and not ſtriated texture within. Of this genus there are three known ſpecies. 1. A hard, whitiſh-brown one, found very frequently on the roofs and ſides of caverns on Mendip hills, and in other parts of England. 2. A dull, crumbly, whitiſh one, found in many parts of England, encruſting the ſides of caverns, and of fiſſures of ſtone. And, 3. A dull, pale-brown one, of a very coarſe texture. This is the moſt common of all the bodies of this genus, and is found in variety of forms; among others, encruſting the ſides and bottoms of our tea-kettles, and other veſſels, in which water is frequently boiled.

PLACENTA. (*Dict.*) The placenta has generally been looked upon as an original part among the ſecundines; but according to Dr. Thomas Simſon of St. Andrews, it ſeems to have no place in the ovarium, nor in the uterus, till once the ovum becomes contiguous to the fundus, and then every contiguous part becomes really a placenta. He thinks the fundus uteri a place peculiarly fitted for the growth of the placenta, as proper ſoils encourage the growth of the roots of trees and ſhrubs, many of which are propagated by the branches however placed: ſo that every part of them ſeems equally fitted to be root or branch. Hence he thinks extra-uterine conceptions can have no placenta; and he ſays, there are no inſtances in authors to contradict his opinion. The placenta, according to Dr. Monro of Edinburgh, does not increaſe in the ſame proportion which the fœtus does; for the ſmaller the fœtus is, the placenta is proportionally larger. The placenta generally adheres to, or near, the fundus of the womb, and is covered on the ſide next to the womb, with a fine membranous continuation of the chorion. The ſeparation of the placenta from the womb muſt produce abortions, and this may be occaſioned by different cauſes operating in various manners, and requires very different treatment to prevent the loſs of the fœtus.

PLANE-TREE, *platanus*, in botany, a genus of the *monoecia-polyandria* claſs of plants, the male corolla whereof is ſcarce viſible: the female one conſiſts of ſeveral concave, oblong, and clavated petals: there is no pericarpium, ſeveral of the fruits conſtituting a round, rough ball; the ſeed, which ſtands upon a ſetaceous ſtyle, is roundiſh, and is terminated by a ſubulated ſtyle, and there is a capillary down adhering to its baſe.

This tree grows to a very conſiderable ſize, and is ramoſe and ſpreading; the bark is ſmooth; the wood firm, and pale-coloured; and the leaves are very large, of a palmated figure, and divided into ſix or ſeven parts at the edge.

PLECTRONITÆ, in natural hiſtory, the ſame with the conicthyodontes. See the article CONICTHYODONTES.

PLUME, a ſet or bunch of oſtrich-feathers pulled out of the tail and wings, and made up to ſerve for ornaments in funerals, *&c.*

Among ſportſmen, plume is the general colour or mixture of the feathers of a hawk, which ſhews her conſtitution. See the article HAWK.

PLUME, or PLUMULE, in botany, a little membrane of the grain or ſeed of a plant, being that which, in the growth of the plant, becomes the ſtem or trunk thereof. See the article SEED, *&c.*

POCHARD, in ornithology, the anas, with grey wings and a black rump. See the article ANAS.

POLAEDRASTYLA, in natural hiſtory, the name of a genus of cryſtals, compoſed of many planes, and having no column. See the article CRYSTAL.

The bodies of this genus are cryſtals compoſed of two octangular pyramids, joined baſe to baſe, and conſequently the whole body conſiſting of ſixteen planes. Of this genus there are only two known ſpecies. 1. A brown kind, with ſhort pyramids, found in conſiderable plenty in Virginia on the ſides of hills. And, 2. A colourleſs one, with longer pyramids. This has yet been found only in one place, which is the great mine at Goſſelaer, in Saxony, and there uſually lies at great depths.

POLLACK, in ichthyology, the name of two different ſpecies of gadus; *viz.* the cole-fiſh or raw-pollack, and the whiting-pollack. See GADUS, COLE-FISH, and WHITING.

POOR. (*Dict.*) POOR, in ichthyology, a name given to the inch and a half gadus, with the anus in the middle of the body. See the article GADUS.

POPE. (*Dict.*) POPE, in ornithology, a ſpecies of alca, with four furrows on the beak,

beak, and with the ſides of the head white. See the article ALCA.

This is a very ſingular bird, ſomewhat larger than the widgeon; the head is large, and rounded; the eyes are ſmall; the beak ſhort; the toes are three, placed forward, and connected by a firm membrane; and the wings are very ſhort, and compoſed of but few feathers, and not intended for high flights.

PORTATE, or a *Croſs*. PORTATE. (*Dict.*) For a view whereof, ſee plate CCV. fig. 4.

PORTUGALLICA TERRA, *earth of Portugal*, in the materia medica, the name of a fine aſtringent bole, dug in great plenty in the northern parts of Portugal, and eſteemed a remedy againſt poiſons and venomous bites, and good in malignant fevers. Whatever may be its virtues of this kind, however, it is manifeſtly an aſtringent of the very firſt claſs, and is uſed with great ſucceſs in fluxes of all kinds. It is well known in ſome parts of the world, beſide the kingdom where it is produced; but is not known in the engliſh ſhops. The cheapneſs of our ſophiſticated bole-armenic, having excluded this whole valuable claſs of medicines from our practice. See the article BOLE.

The characters by which the portugueſe earth is known from the other red boles, are theſe: It is of a cloſe, compact, and regular texture, conſiderably heavy, and of a fine florid red, of a ſmooth and ſhining ſurface, eaſily breaking between the fingers, and a little ſtaining the hands. It adheres firmly to the tongue, melts freely and readily in the mouth, and has a ſtrongly aſtringent taſte, but leaves a little grittineſs between the teeth. It does not ferment with acids, and ſuffers ſcarce any change of colour in the fire.

POROUS, (*Dict.*) in natural hiſtory, a name given by authors to a peculiar kind of foſſile coral, of which there are many different ſpecies; theſe are all of a beautifully laminated ſtructure, and ſeem allied to the mycetitæ or fungitæ; they are ſeldom found looſe, but uſually bedded in hard marble, and with their pores filled up with ſparry or mineral matter. See the article CORAL.

POSSUM, or OPOSSUM, in ichthyology. See the article OPOSSUM.

POTTERS-WARE. See POTTERY.

PRÆADAMITES, or PREADAMITES. See the article PREADAMITE.

PRÆTOR, or PRETOR. See PRETOR.

PREFIX, or AFFIX, in grammar, a particle added at the beginning of a word, either to diverſify its form, or to alter its ſignification.

PRESENCE, *præſentia*, a term of relation uſed in oppoſition to abſence, and ſignifying the exiſtence of a perſon in a certain place, or the ſtate of a perſon conſidered as co-exiſting with another. In this ſenſe, an obligation is ſaid to be paſſed in preſence of a notary and witneſſes. At the breaking open the ſeal of a minor or abſent perſon, the preſence of a ſubſtitute is neceſſary: where a ſuperior magiſtrate is preſent, it ſometimes takes away the power of an inferior. It has been held, that the preſence of one feoffee may ſerve for all the reſt.

PROSECUTION. To make men liable to criminal proſecutions by the law of England, it is required, that they have the uſe of reaſon, and that they be *ſui juris*. On the firſt account, the law indulges infants under the age of diſcretion, idiots, and lunatics, whatever the nature of the fact may be; and even againſt the perſon of the king, as it has been held of late; neither will it ſuffer one who becomes *non compos*, after he has committed a capital offence, to be either arraigned or executed. See the articles LUNATIC, INFANT, and IDIOT.

PTERARIA, in the hiſtory of inſects, a name given to that ſeries of inſects, which have wings. See INSECT.

Of the inſects of this ſeries, ſome have only two wings, others have four; they are hence naturally arranged into the two orders of the diptera and the tetraptera. See DIPTERA and TETRAPTERA.

PTERIS, in botany, a genus of the *cryptogamia-filicum* claſs of plants, in which the fructifications are diſpoſed in form of a line, ſurrounding the edges of the lower ſide of the leaves.

This genus comprehends the female fern and the rough ſpleenwort.

PULEX, the FLEA, in zoology. See the article FLEA.

PURSLAIN, *portulaca*, in botany, a genus of the *polyandria-monogynia* claſs of plants, the corolla whereof conſiſts of five plane, erect, obtuſe, emarginated petals, larger than the cup; the fruit is an oval, covered capſule, containing only one cell, and opening horizontally at the middle; the ſeeds are numerous, ſmall, and roundiſh.

This plant is cultivated in gardens for culinary uſes; the ſeeds are ranked

among the leſſer cold ſeeds, and have ſometimes been employed in emulſions, and the like, along with others of that claſs.

PUTORIUS the POLE-CAT, in zoology, the yellowiſh black muſtela, with a white mouth and a yellow collar. See the article MUSTELA.

This creature is ſomewhat ſmaller than the martin; the head is ſmall, oblong, pointed at the extremity, and rounded on the ſummit; the ears are ſhort, broad, patulous, and white at the edges; the eyes are large, black, and piercing in their aſpect; the mouth is wide, and well furniſhed with teeth; the neck is ſhort and thick; the body is long and ſlender; and the legs are ſhort, and not very robuſt.

PUTTOCKS, or PUTTOCK *ſhrouds*, in a ſhip, are ſmall ſhrouds which go from the ſhrouds of the main-maſt, fore-maſt, and mizen-maſt, to the top-maſt ſhrouds; and if there be any top-gallant maſts, there are puttocks to go from the top-maſt ſhrouds into theſe. Theſe puttocks are at the bottom ſeized to a ſtaff, or to ſome rope which is ſeized to a plate of iron, or to a dead-man's eyes, to which the lanniards of the fore-maſt ſhrouds do come.

PYE, or SEA-PYE, *hæmatopus*. See the article HÆMATOPUS.

PYGARGUS, in ornithology, the falco with a yellow cera, and with the tail-feathers white and black at the end. See the article FALCO.

This is a very large bird, it at leaſt equals a peacock in ſize; the wings are very large; the beak is ſhort, but robuſt and hooked, and the bent part of the upper-mandible reaches a finger's breadth beyond the lower; the eyes are very large, and a little ſunk in the head; the iris is hazel, the legs and feet are very ſtrong and robuſt, the claws are very large, and the hinder one not leſs than an inch in length.

PYRICUBIUM, in natural hiſtory, the name of a genus of foſſil bodies, uſually comprehended, with many others of very different figure and ſtructure, under the general name of pyrites. See the article PYRITES.

The diſtinguiſhing characters of the pyricubia are theſe: they are compound, inflammable, metallic bodies, of a cubic figure, or reſembling a die, being compoſed of ſix ſides. Of this genus there are only two known ſpecies: 1. The great pyricubium, of a foliaceous ſtructure; and, 2. The ſmaller ſolid pyricubium. The firſt of theſe is a very elegant foſſil, and is ſo regularly ſhaped, and ſo highly poliſhed by nature, that it has been often ſuppoſed to be wrought by art. It is but moderately hard, but is very heavy, and is of a foliaceous ſtructure. The moſt common ſpecimens of it are about a third of an inch in diameter; but it is found much larger, even to three inches, and ſo ſmall as to the tenth of an inch. It is perfectly poliſhed and ſmooth on all its ſurfaces, and is of a very beautiful whitiſh green, with a faint admixture of yellow. It is found in the German and Hungarian mines, and in the Eaſt-Indies. The ſecond ſort, or the ſmall ſolid pyricubium, is a foſſil of much leſs beauty, tho' equally regular in its ſhape and appearance. It is very heavy, and extremely firm and hard, and is not of a foliaceous or flaky ſtructure, but of one regular and uniform maſs, and when broken appears very bright and gloſſy. Its uſual ſize is about the eighth of an inch diameter, but it is found ſmaller than a pin's head, and ſometimes ſo large as to be near an inch. It is perfectly ſmooth on all its ſurfaces, and is naturally of a pale yellowiſh green, and as bright on the outſide as within; but very often it is found of a ferrugineous or duſky ſurface, owing to a ſort of ruſting, which is an accident to which the ſeveral ſpecies of naturally bright pyrites are moſt of them alſo ſubject. It is very common in Germany and Italy, and in ſome parts of America, as alſo in our own country.

PYRIPLACIS, in natural hiſtory, the name of a genus of pyrites, the characters of which are theſe: they are compound, inflammable, metallic bodies, found in looſe detached maſſes, of a ſimple and uniform, not ſtriated, internal ſtructure, and are covered with an inveſtient coat or cruſt. See PYRITES.

Of this genus of foſſils there are three known ſpecies: 1. A flatted kind, with a ſcabrous coat. 2. A globoſe one, with a cracked and furrowed coat. And 3. A flatted one, with a very thick browniſh-white cruſt. The firſt of theſe is a duſky browniſh green maſs, ſurrounded and every way covered by a ferrugineous coat, of the thickneſs of a ſhilling or more, which is rendered very rough and ſcabrous, by having received multitudes of ſmall pebbles and particles of ſand into its

its ſubſtance while yet moiſt, which are become firmly bedded in it, and make a part of its ſubſtance. This is common in the gravel-pits about London. The ſecond is of an orbicular figure, and is of a very coarſe ſtructure, being compoſed of viſible granules, and is of a pale yet duſky green colour. It is covered with a browniſh yellow or ferrugineous coat, of the thickneſs of half a crown, or ſometimes much more. This ſpecies is found of all the intermediate ſizes between an ounce and eight or ten pounds in weight. It is very common in the chalk-pits of Kent, and in many other parts of the kingdom. The third is a very ſingular ſpecies. It is very hard, and moderately heavy, and is uſually of a flatted, orbicular, or oval figure; and its moſt frequent ſize is between two and three inches in diameter. It is of an irregular, uneven, and rough ſurface, full of ſmall prominences, very harſh and rough to the touch, and looks merely like a lump of greyiſh hard clay. When broken, it is found, however, to conſiſt of a nucleus of the ſame ſhape with the whole body, and every way equally ſurrounded with a cruſt of a thickneſs equal to its whole diameter, or nearly ſo. The nucleus is of a deep and duſky browniſh-green colour, and of a plain ſimple ſtructure; being compoſed of no viſible moleculæ. The cruſt is of a pale, greyiſh-brown, earthy ſubſtance, appearing like an indurated earth, and glittering in ſome few places with ſmall gloſſy particles. This is found in great plenty in ſome of the clay-pits about London.

PYRIPOLYGONIUM, in natural hiſtory, the name of a genus of foſſils, the characters of which are, that they are compound, metallic bodies, of a regular figure, conſiſting of twelve planes.

There is only one known ſpecies of this genus, tho' ſubject to great varieties in its appearance; and this has been by authors hitherto confounded, with many other bodies of very different nature and figure, under the general name pyrites. The pyripolygonium, when perfect, is an extremely elegant and beautiful foſſil; but this is a ſtate it is very rarely found in. It is moderately firm, of a compact texture, and very heavy; tho' its natural figure be a regular body, compoſed of twelve planes, yet it is ſubject to great imperfections and irregularities. It is found from the twentieth part of an inch, to four inches in diameter; but its moſt common ſize is about a third of an inch. It is naturally of a poliſhed and ſhining ſurface, and of a pale whitiſh yellow; but ſometimes it is browniſh, or of an iron-colour. It is not unfrequent in Cornwall and Devonſhire; but is much more common in Germany.

PYRITRICHIPHYLLUM, in natural hiſtory, the name of a genus of foſſils of the claſs of the pyrites, the characters of which are theſe: they are compound, inflammable, metallic bodies, found in looſe maſſes, not of any regularly angular figure, and of a ſtriated texture, with foliaceous ends to the ſtriæ, appearing on the ſurface or within the maſs. See PYRITES.

Of this genus there are only two known ſpecies; one having the foliaceous ends of the ſtriæ on the outer ſurface of the maſs, and the other having a ſmooth external ſurface, and the foliaceous ends of the ſtriæ covering the ſides of internal hollows. The firſt is a foſſil of great beauty, of a very firm texture, remarkably heavy, and uſually found in large maſſes of an orbicular or oblong figure: theſe maſſes are ſometimes compoſed wholly of the matter of the pyrites, and in others they are only coats of that ſubſtance ſurrounding ſtones. The ſecond is a foſſil of equal beauty with the former, tho' of a very different appearance; it is very hard and very heavy, and is always found in detached maſſes; but theſe of a very ſingular kind, for they are always more or leſs hollow. Theſe maſſes are of various figures and appearances, ſometimes round and like pebbles, but more frequently full of odd protuberances, like the flints in our chalk-pits; and ſometimes the maſſes of it are found running over the ſurfaces of ſtones in form of cruſts, which are variouſly protuberant in different parts, and riſe into frequent beautiful tho' irregular tubercles.

PYRITRICHUM, in natural hiſtory, the name of a genus of pyrites, the characters of which are theſe: they are compound, inflammable, metallic foſſils, always found in detatched maſſes of no regularly angular figure, and of a ſimply ſtriated internal ſtructure. See the article PYRITES.

Of this genus of pyrites there are three known ſpecies, 1. A globoſe one, with an irregular ſurface. 2. A globoſe one, covered with angular tubercles. 3. A ſilver-coloured globoſe one, with a ſmooth

ſurface. The firſt is conſiderably hard, and very remarkably heavy, and is uſually of a roundiſh form, tho' ſometimes oblong; ſometimes it is full of irregular prominences on the ſurface, and ſometimes is a complex maſs, conſiſting of a great number of roundiſh maſſes of ſmoother or rougher ſurfaces joined together. It is very various in ſize; the more common ſpecimens of it are of ſix or eight ounces weight, tho' there are others of leſs than an ounce, and ſome of ſeveral pounds. The ſecond is a very firm and hard body, uſually of an orbicular figure, and ſometimes, tho' rarely, oblong; it is of a very remarkable rough ſurface, being covered with pyramidal tubercles, with very obtuſe ends. The third is an extremely elegant and beautiful ſpecies, it is but moderately hard, tho' remarkably heavy, and is uſually of a regularly orbicular form, tho' ſometimes it varies from that like the other pyrites. Its moſt frequent ſize is about an inch and half in diameter; but it is ſometimes found as ſmall as a nut, or a ſchool-boy's marble, and ſometimes of more than two pounds weight. Its ſurface is uſually ſmooth and even, and it is never covered with any coat or cruſt. It is of a very regularly ſtriated internal ſtructure, and of a beautiful ſilvery green colour: the ſtriæ are moderately broad, and run very evenly from the center to the circumference; and very often there is a ſmall and firm central nucleus, which is much harder than the reſt of the maſs, and is of a plain not ſtriated ſtructure. All the three ſpecies are found plentifully in different parts of the kingdom: the firſt in all ſorts of ſtrata, and often looſe on the ground; the ſecond, principally in the chalk-pits of Kent and Suſſex; and the laſt in Eſſex and Hampſhire, and very frequently in the German mines.

PYROCTOGONIUM, in natural hiſtory the name given by Dr. Hill to a genus of foſſils comprehended by authors, with many other bodies, under the general name pyrites. See PYRITES.

The characters of the pyroctognium are theſe: it is a compound, inflammable, metallic body, of a regular octohaedral figure, or compoſed of eight planes. There is only one known ſpecies of this genus, which is a very ſingular and elegant foſſil, being compoſed of eight triangular planes; theſe being the ſides of two quadrilateral pyramids with broad baſes, which being joined baſe to baſe, conſtitute the pyroctogonium.

R.

RAISINS. (*Dict.*) RAISIN-*brandy*, a name given by our diſtillers to a very clear and pure ſpirit, procured from raiſins, fermented only with water. Thus treated, they yield a ſpirit ſcarce at all diſtinguiſhable from ſome of the wine-ſpirits; for there are as many kinds of wine-ſpirits, as there are of grapes. The coarſer the operation of diſtilling is performed in this caſe, the nearer will be the reſemblance of the wine-ſpirit; that is, there will be moſt of this flavour in the ſpirit, when as much as can be of the oil is thrown up with a galloping heat. Dr. Shaw obſerves, that the diſtillers are very fond of the wine-ſpirit, with which they hide and diſguiſe the taſte of their nauſeous malt, and other ſpirits; and in defect of that ſpirit, this of raiſins, made in this coarſe manner, will go almoſt as far. It is indeed ſurpriſing how extenſive the uſe of theſe flavouring ſpirits is, ten gallons of raiſin-ſpirit, or ſomewhat leſs of the wine-ſpirit, being often ſufficient for a whole piece of malt-ſpirit, to take off its native flavour, and give it an agreeable vinoſity. It is no wonder therefore, that the diſtillers and ordinary rectifiers are ſo fond of this, as it is a good cloak for the defects and imperfection of their proceſſes. When raiſin-brandy is intended for common uſe, the fire ſhould be kept ſlower and more regular in the diſtillation, and the ſpirit, though it hath leſs of the high flavour of the grape, will be more pleaſant and more pure.

RECTIFIER, (*Dict.*) in the diſtillery, the perſon whoſe employment it is to take the coarſe malt-ſpirit of the malt-ſtiller, and re-diſtil it to a finer and better liquor. The art of the rectifier, according

cording to Dr. Shaw, might be entirely ſet aſide, if the malt-ſtiller could make his ſpirit perfect at the ſecond operation; which ſeems very practicable, if the malt-ſtillers could be got to forſake their old track. The great things to be recommended for the improvement of their art, would be firſt the brewing in perfection, and ſecondly the keeping their waſh after the manner of ſtale beer, till it has entirely loſt its malt-flavour, and acquired a pungent, acid vinoſity; and then, thirdly, leaving out the lees, to diſtill with a well regulated fire. It is ſcarce to be thought how pure a ſpirit is to be obtained from malt this way: but the great art would be, the finding a way to make malt liquors artificially ſtale, bright, and flavourleſs, though otherwiſe vinous.

RELL-MOUSE, in zoology, the white bellied mus, with a blackiſh back and a long body. See MUS.

This creature is not ſo thick in the body as the common rat, but is longer, and approaches in ſome degree to the form of the weaſel; the head is oblong, large at the upper part, but very ſlender at the ſnout; both the jaws are equal in length, and the upper lip is ſplit, as in the hare; the teeth are long, ſlender, and ſharp; the eyes are black and prominent; the ears are ſhort, naked, and obtuſe; the tail is ſhort and hairy; and the legs are ſhort, eſpecially the anterior pair.

RHOMBOIDIA, in natural hiſtory, the name of a genus of ſpars, given them from their being of a rhomboidal form. They owe this figure to an admixture of particles of iron, and conſiſt of ſix planes. Of this genus there are only two known ſpecies. 1. A white, thin one, with very thin cruſts; and 2. A whitiſh brown thick one, with thicker cruſts. Theſe are both found in the foreſt of Dean in Glouceſterſhire, and in other places where there are iron-ores.

RICHARDIA, in botany, a genus of the *hexandria monogynia* claſs of plants, the corolla whereof conſiſts of a ſingle petal, of an infundibuliform ſhape; the limb is divided into ſix parts, erect and acute; there is no pericarpium; the ſeeds are three, roundiſh, angular on one ſide, broadeſt upwards, and gibbous.

ROCK, *rupes*, a large maſs or block of hard ſtone rooted in the ground. See STONE.

ROCK-*alum*. See ALUM.

ROCK-*cryſtal*, otherwiſe called ſprig-cryſtal, in natural hiſtory, a name given to the third order of cryſtals, from their being affixed to a rock, or other ſolid body.

This kind of cryſtal is the moſt common of all others, and is what the generality of authors deſcribe under the name of cryſtal of the ſhops, being that kept for medicinal purpoſes. See CRYSTAL.

The cleareſt, pureſt, and moſt tranſparent that can be had, ought to be choſen; and to prove its genuineneſs, it may be tried with aqua fortis, true cryſtal making no efferveſcence with that menſtruum.

ROCK-*fiſh*, a common engliſh name for the gobius marinus, or ſea gudgeon.

ROCK-*oil*. See PETROLEUM.

ROCK-*ſalt*. See SALT.

ROYAL. (*Dict.*) ROYAL-EXCHANGE, the burſe or meeting-place of the merchants in London. See EXCHANGE.

It was built in 1566, at the charge of Sir Thomas Greſham, and in a ſolemn manner, by herald with ſound of Trumpet, in preſence of queen Elizabeth, proclaimed the royal exchange. Till that time the merchants met in Lombard-ſtreet. It was built of brick, yet then eſteemed the moſt ſplendid burſe in Europe. An hundred years after its building, at the great fire, it was burnt down; but ſoon raiſed again in a ſtill more magnificent manner, the expence thereof amounting to £. 50,000. One half of this ſum was diſburſed by the chamber of London, the other by the company of mercers, who, to reimburſe themſeves, let to hire 190 ſhops above ſtairs, at £. 20 each, which, with other ſhops, &c. on the ground, yield a yearly rent of above £. 4000; yet the ground it ſtands on does not exceed three-fourths of an acre, whence it is obſerved to be much the richeſt ſpot of ground in the world. It is built quadrangular, with walks around, wherein the merchants of the reſpective countries aſſociate themſelves. In the middle of the area or court is a fine marble-ſtatue of king Charles II. in the habit of a roman Cæſar, erected by the ſociety of merchant-adventurers. Around are the ſtatues of the ſeveral kings ſince the Norman conqueſt, ranged.

ROYAL-*oak*, a fair ſpreading tree at Boſcobel, in the pariſh of Donnington in Staffordſhire, the boughs whereof were once covered with ivy; in the thick of which king Charles II. ſat in the day-time with colonel Careleſs, and in the night lodged in Boſcobel-houſe; ſo that they are miſtaken who ſpeak of it as an

old

old hollow oak, it being then a gay flouriſhing tree, ſurrounded with many more. The poor remains thereof are now fenced in with a handſome wall, with this inſcription over the gate in gold-letters. *Fœliciſſimam arborem quam in aſylum potentiſſimi regis* Caroli II. *Deus op. max. per quem reges regnant, hic creſcere voluit*, &c.

ROYAL-*ſociety*. See SOCIETY.

RUNGS, in a ſhip, the ſame with the floor or ground timbers, being the timbers which conſtitute her floor, and are bolted to the keel, whoſe ends are rung-heads.

RUNG-*heads*, in a ſhip, are made a little bending, to direct the ſweep or mold of the futtocks and naval timbers: for here the lines, which make the compaſs and bearing of a ſhip, do begin.

RUNNING. (*Dict.*) RUNNING, in antiquity, made one of the exerciſes performed in the pentathlon or quinquertium. See PENTATHLON.

This exerciſe was in ſo great eſteem among the antient Greeks, that ſuch as prepared themſelves for it, thought it worth their while to burn or parch their ſpleen, becauſe it was believed to be an hindrance to them. Indeed, all thoſe exerciſes, that conduced to fit men for war, were more eſpecially valued; and that ſwiftneſs was eſteemed ſuch in an eminent degree, appears from Homer's giving his hero the epithet of ποδας ωκυς Αχιλλευς.

RUPERT's DROPS, a ſort of glaſs-drops with long and ſlender tails, which burſt to pieces on the breaking off thoſe tails in any parts, ſaid to have been invented by prince Rupert, and therefore called after his name. This ſurpriſing phænomenon is ſuppoſed to riſe from hence, that while the glaſs is in fuſion, or in a melted ſtate, the particles of it are in a ſtate of repulſion; but being dropped into cold water, it ſo condenſes the particles in the external parts of their ſuperficies, that they are eaſily reduced within the power of each others attraction, and by that means they form a ſort of hard caſe, which keeps confined the beforementioned particles in their repulſive ſtate; but when this outer-caſe is broke, by breaking off the tail of the drop, the ſaid confined particles have then a liberty to exert their force, which they do by burſting the body of the drop, and reducing it to a very peculiar form of powder.

Book of RUTH, a canonical book of the Old Teſtament, being a kind of appendix to the book of judges, and an introduction to thoſe of Samuel; and having its title from the perſon whoſe ſtory is here principally related. In this ſtory are obſervable the antient rights of kindred and redemption, and the manner of buying the inheritance of the deceaſed, with other particulars of great note and antiquity.

S.

SABOT, a kind of wooden ſhoe, much wore by the peaſants in France. See the article CALIGA.

SAL. (*Dict.*) SAL CIRCULATUM, in chemiſtry, a term uſed by Paracelſus for a preparation of ſea-ſalt, of which he diſtinguiſhes two kinds, under the name of the circulatum minus, and the circulatum majus. Theſe ſeem to have a great affinity with the famous alkaheſt, or univerſal ſolvent, ſo much talked of in the works of this author and his ſucceſſor Van Helmont. See ALKAHEST.

SALINE, a name given to a preparation of ſea-ſalt, procured from the froth of the ſea, hardened by the ſun in hot countries. It is called by ſome authors pilatro de Levante, and is uſed in glaſs-making; and in the making the fine purple-colour from cochineal, by boiling it in a ſmall quantity, with the bran and fœnugreek, of which the magiſtery is made for that purpoſe.

SALINE is alſo the name given by authors to ſprings of ſalt-water, called by us ſalt-wells, ſalt-ſprings, and brine-pits.

SALINE *principle*, a term uſed by the chemical writers, to expreſs a conſtituent part of ſeveral mixt bodies, on which their exiſtence in that form depends; and which, though always exiſtent in them, and always ſeparable by art, is yet not per-

perceivable in many of them in the complex.

SALINE *earths*. The chemiſts under this, as a general head, reckon all thoſe ſaline and earthy ſubſtances, which are calcined or burnt in the fire: as all the kinds of lime, pot-aſhes, ſoot, and the like; theſe being ſo many mixtures of ſalt and earth; and all ſalts appearing to them, indeed, on a rigorous examination, to be only earths of different natures, which when reduced to a certain degree of ſubtilty or fineneſs of parts, ſo as permanently to diſſolve in water, are then emphatically denominated ſalts.

Books of SAMUEL, two canonical books of the Old Teſtament, ſo called, as being uſually aſcribed to the prophet Samuel. The books of Samuel, and the books of Kings are a continued hiſtory of the reigns of the kings of Iſrael and Judah; for which reaſon the books of Samuel are likewiſe ſtyled the firſt and ſecond books of Kings. Since the firſt twenty-four chapters contain all that relates to the hiſtory of Samuel, and that the latter part of the firſt book, and all the ſecond, include the relation of events that happened after the death of that prophet, it has been ſuppoſed that Samuel was author only of the firſt twenty-four chapters, and that the prophets Gad and Nathan finiſhed the work. The firſt book of Samuel comprehends the tranſactions under the government of Eli, and Samuel; and under Saul, the firſt king; and alſo the acts of David, whilſt he lived under Saul; and is ſuppoſed to include the ſpace of an hundred and one years. The ſecond book contains the hiſtory of about forty years, and is wholly ſpent in relating the tranſactions of kind David's reign.

SANIDIUM, in natural hiſtory, the name of a genus of foſſils, of the claſs of the ſelenitæ, but neither of the rhomboidal nor columnar kinds, nor any other way diſtinguiſhable by its external figure, being made up of ſeveral plain, flat plates. See the article SELENITÆ. The ſelenitæ of this genus are of no determinate form, nor conſiſt of any regular number of planes or angles, but are merely flat, broad, and thin plates or tables, compoſed of other yet thinner plates, like the talcs, but diſtinguiſhed from thoſe bodies by this, that theſe plates are made up of arangements of ſlender fibres, diſpoſed obliquely, but in uninterrupted lines acroſs the body. Of this genus there are only two known ſpecies, the one colourleſs and pellucid, the other whitiſh and opake. The firſt is found pretty frequently about Oxford, as alſo in Northamptonſhire, Yorkſhire, and other counties; the other is very common in all parts of Germany, and is found alſo in Leiceſterſhire, and ſome other parts of England, but with us about London it is not common.

SAPHENA, in anatomy, a vein which ariſing over the malleolus internus up along the leg and the inner-part of the thigh, diſcharges itſelf near the groin into the crural vein. It is this vein they uſually open when they bleed in the foot for ſuppreſſions of the menſes. See the article PHLEBOTOMY.

SAPHETA, in architecture, is the board over the top of a window, placed parallel and oppoſite to the window ſtool at the bottom.

SAPIENTIAL, an epithet applied to certain books of ſcripture, calculated for our inſtruction and improvement in prudence or moral wiſdom, thus called in contradiſtinction to the hiſtorical and prophetical books. See BIBLE, *&c.* The ſapiential books are Proverbs, Canticles, Eccleſiaſtes, the Pſalms, and Job; though ſome reckon this laſt among the hiſtorical books. See the articles HAGIOGRAPHER, CANTICLES, *&c.*

SAPIENTIÆ *dentes*, in anatomy, the two laſt or inmoſt of the dentes molares of the upper-jaw, one on each ſide, thus called becauſe they appear not till perſons are grown. See the article TOOTH.

SAPIENZA, an iſland and cape in the mediterranean ſea, on the ſouth-weſt point of the Morea, eaſt long. 21° 15′. north lat. 36° 45′.

SAPPHIC, in poetry, a kind of verſe much uſed by the Greeks and Latins, denominated from the inventreſs Sappho. The ſapphic verſe conſiſts of five feet, whereof the firſt, fourth and fifth are trochees, the ſecond a ſpondee, and the third a dactyl; as in

1	2	3	4	5
Aure-	*am quiſ-*	*quis medi-*	*ocri-*	*tatem*
Dili-	*git, tu-*	*tus caret*	*obſo-*	*leti*
Sordi-	*bus te-*	*cti, caret*	*invi-*	*denda.*

and after every three ſapphic verſes, there is generally ſubjoined an adonic verſe, as

Sobrius aulâ.

See the article ADONIC.

SCAL-

SCALPRA *dentalia*, inſtruments uſed by the ſurgeons to take off thoſe black, livid, or yellow cruſts, which infeſt the teeth, and not only looſen and deſtroy them, but taint the breath. According to the varieties of the occaſion, the ſurgeon has theſe inſtruments of various ſhapes and ſizes; ſome are pointed, and narrow at the end; others are broader pointed, and have edges, others are hooked, or falciform, but theſe are uſually, for convenience of carriage, all adapted to one handle. The manner of uſing them is to begin near the gums, ſupporting the blade with the left-hand, and ſcraping all along the tooth, till the cruſt is taken off, taking care not to wound the gums, or diſplace the teeth.

SCANSORIUM, in Roman antiquity, an engine whereby people were raiſed aloft, that they might ſee more conveniently about them. The ſcanſorium amounted to the ſame with what was called the acrobatica among the Greeks. Authors are divided as to the office of this engine. Turnebus and Barbarus, take it to have been of the military kind, raiſed by beſiegers, high enough to over-look the walls, and diſcover the ſtate of things on the other ſide. Baldus rather ſuppoſes it a kind of moveable ſcaffold, or cradle contrived for raiſing painters, plaiſterers, and other workmen, to the tops of houſes, trees, *&c.* Some ſuſpect that it might have been uſed for both purpoſes.

SCAPULA. (*Dict.*) *Fracture of the* SCAPULA. The ſcapula is uſually fractured either near its acromion, or head where it joins the clavicle, or in ſome more diſtant part. If the fracture happens in the proceſs of the acromion, the reduction will be eaſily made, by lifting up the arm to relax the deltoid-muſcle, and puſhing the arm evenly upwards, making the fractured parts meet together with the fingers: but notwithſtanding their reduction is ſo eaſy, they eaſily ſlip away again from any ſlight cauſe, and ſo are difficultly agglutinated. They are in particular very eaſily ſeparated by the weight and motion of the arm, and by the contraction of the deltoid-muſcle, inſomuch that there is ſcarce ever an inſtance of a fractured acromion being ſo perfectly cured, as to admit afterwards of a free motion of the arm upwards: all means muſt, however, be uſed to endeavour to keep the replaced bones in their proper ſituation. A compreſs, wet with ſpirit of wine, is to be applied to the fracture, a ball is to be put under the arm-pit to ſupport it; the whole is to be bound up with the bandage commonly called ſpica, and the arm is to be ſuſpended in a ſaſh or ſling hung about the neck. But if the neck of the ſcapula, which lies under the acromion, or its acetabulum, ſhould be fractured, which is a caſe that indeed very ſeldom happens, and when it does is very difficult to diſcover, it is a hundred to one but from the vicinity of the articulation, the tendons, muſcles, ligaments, nerves, and large veins and arteries, there will follow a ſtiffneſs and loſs of motion in the joint; great inflammation is alſo to be apprehended, and abſceſſes with the worſt ſymptoms, and ſometimes death itſelf.

SCARBOROUGH. (*Dict.*) SCARBOROUGH *water*. The water of this medicinal ſpring has been the ſubject of great conteſts and diſputes among the phyſical people; all allowing it conſiderable virtues, but ſome attributing them to one ingredient, others to another.

SCATCH-MOUTH, in the manege, a bit-mouth, differing from a canon-mouth in this, that the cannon is round, whereas a ſcatch is more upon the oval. That part of the ſcatch-mouth that joins the bit-mouth to the branch, is likewiſe different; a cannon being ſtayed upon the branch by a fonceau, and a ſcatch by a chaperon, which ſurrounds the banquet. The effect of the ſcatch-mouth is ſomewhat greater than that of the canon-mouth, and keeps the mouth more in ſubjection. Commonly ſnaffles are ſcatch-mouths.

SCLEROPTERA, in natural hiſtory, the name of that claſs of inſects which have four wings, the exterior flexile, and the interior membranaceous; and which have the aperture of the mouth bent under the breaſt.

SCORE. (*Dict.*) SCORE in muſic, denotes partition, or the original draught of the whole compoſition, wherein the ſeveral parts, *viz.* treble, ſecond treble, baſs, *&c.* are diſtinctly ſcored and marked. See PARTITION and MUSIC.

SCOT, *ſcotta*, a cuſtomary contribution laid upon all ſubjects according to their abilities. Whoever were aſſeſſed to any contribution, though not by equal portions were ſaid to pay ſcot and lot. See the article LOT.

SCOTIA,

SCOTIA, in architecture, a ſemicircular cavity or channel between the tores, in the baſes of columns. See the articles COLUMN and BASE.

The Scotia has an effect juſt oppoſite to that of the quarter-round. Our workmen frequently call it the caſement.

It is alſo called trochilus, partly from its form. See TROCHILUS, *&c.*

In the ionic and corinthian baſe, there are two ſcotias, the upper whereof is the ſmaller. See IONIC and CORINTHIAN.

According to Felibien, the cavetto is a fourth part of the ſcotia. See the article CAVETTO.

SCOTISTS, a ſect of ſchool-divines and philoſophers, thus called from their founder J. Duns Scotus, a Scotiſh, or as others ſay, an Iriſh cordelier, who maintained the immaculate conception of the virgin, or that ſhe was born without original ſin, in oppoſition to Thomas Aquinas and the Thomiſts. See THOMISM.

As to philoſophy, the Scotiſts were like the Thomiſts, only diſtinguiſhed by this, that in each being, as many different qualities as it had, ſo many different formalities did they diſtinguiſh, all diſtinct from the body itſelf, and making as it were ſo many different entities, only thoſe metaphyſical, and as it were ſuperadded to the being.

SCOTOMIA, or SCOTOMA, in medicine, a dizzineſs or ſwimming in the head, wherein the animal ſpirits are ſo whirled about, that external objects ſeem to turn round. See the article VERTIGO.

SCRATCH, in the language of the ſalt-workers of our country, the name of a calcarious, earthy, or ſtony ſubſtance, which ſeparates from ſea-water in boiling it for ſalt. This forms a thick cruſt, in a few days, on the ſides and bottoms of the pans, which they are forced to be at the pains of taking off once in a week, or ten days, otherwiſe the pans burn away and are deſtroyed. See SALT.

SCRATCH-PANS, in the Engliſh ſalt-works, a name given to certain leaden pans, which are uſually made about a foot and half long, a foot broad, and three inches deep, and have a bow, or circular handle of iron, by which they may be drawn out with a hook, when the liquor in the pan is boiling, See the article SALT.

The uſe of theſe pans is to receive a calcarious earth, of the nature of that which incruſts our tea-kettles, which ſeparates from the water in boiling; this ſubſtance they call ſcratch; and theſe pans, being placed at the corners of the ſalt-pan, where the heat is leaſt violent, catch it as it ſubſides there.

SCRATCH-WORK, *ſgraffiata*, a way of painting in freſco, by preparing a black ground, on which is laid a white plaiſter, which white being taken off with an iron bodkin, the black appears through the holes, and ſerves for ſhadows. See the article SGRAFFIT.

This kind of work is laſting, but, being very rough, is unpleaſant to the ſight.

SCRATCHES, among farriers, a diſtemper incident to horſes, conſiſting of dry ſcabs, chops, or rifts, that breed between the heel and the paſtern-joint. There are various kinds of ſcratches, diſtinguiſhed by various names, as crepances, rats-tails, mules, kibes, pains, *&c.* which are all ſo many ſpecies of the ſame malady, engendered from ſome dry humour falling on the legs, or from the fumes of the beaſts own dung lying under his heels, eſpecially after a journey from over-hard riding, *&c.* This diſorder begins firſt with dry ſcabs in the paſtern-joint in ſeveral forms. It is known by the ſtaring, dividing and curling of the hair on the ſpot.

SCRUPI, in natural hiſtory, a claſs of foſſils, formed into large detached maſſes without cruſts, and compoſed of a variouſly debaſed cryſtalline matter. Of this claſs there are two orders, and under thoſe four genera, *viz.* the firſt order comprehends thoſe ſcrupi, of a more rude and irregular ſtructure in the maſs, as the telaugia; and the ſecond order comprehends thoſe of a more equal and regular conſtitution, as the petridia and the jaſpides. See TELAUGIA, *&c.*

SECOMIÆ, in natural hiſtory, the name of a genus of foſſils, of the claſs of the ſeptariæ, the characters of which are; that they are bodies of a duſky hue, didided by ſepta, or partitions of a ſparry matter, into ſeveral more or leſs regular portions, of a moderately firm texture, not giving fire with ſteel, but fermenting with acid menſtrua, and eaſily calcining. See SEPTARIÆ.

The ſeptariæ of this genus are, of all others, the moſt common, and are what have been known by the little expreſſive, or miſtaken names of the waxen vein, or ludus helmontii. We have many ſpecies of theſe bodies common among us.

us. Of the whitiſh or browniſh kinds we have thirteen; of the yellowiſh five, and of the ferrugineous ones four.

SECOND. (*Dict.*) SECOND *deliverance, ſecunda deliberatione*, a judicial writ that lies after nonſuit of the plaintiff in replevin, and a returno habendo of the cattle replevied, adjudged to him that diſtrained them; commanding the ſheriff to replevy the ſame cattle again, upon ſecurity given by the plaintiff in the replevin for a redelivery of them, if the diſtreſs be juſtified. It is a ſecond writ of replevin, *&c.*

SECTA *ad curiam*, in law, a writ which lieth againſt him who refuſeth to perform his ſuit to the county-court, or court-baron.

SECTA *curiæ*, in our old writers, ſuits and ſervice done by the tenants at the court of their lord.

SECTA *facienda per illam quæ habet æniciam partem*, a writ to compel the heir that hath the elder's part among coheirs, to perform ſervice for all the coparceners.

SECTA *molendini*, a writ lying where a man by uſage, time out of mind, *&c.* has ground his corn at the mill of a certain perſon, and afterwards goes to another mill with his corn, thereby withdrawing his ſuit to the former. And this writ lies eſpecially for the lord againſt his tenants, who hold of him to do ſuit at his mill.

SECTA *regalis*, a ſuit by which all perſons were bound twice in a year to attend the ſheriff's tourn, and was called regalis, becauſe the ſheriff's tourn was the king's leet; wherein the people were to be obliged by oath to bear true allegiance to the king, *&c.*

SECTA *unica tantum faciendo pro pluribus hæreditatibus*, a writ that lies for an heir who is diſtrained by the lord to do more ſuits than one, in reſpect of the land of divers heirs deſcended to him.

SECTINEUS, in anatomy, a ſmall, flat, and pretty long muſcle, broad at the upper part, and narrow at the lower; ſituated obliquely between the os pubis, and the upper part of the os femoris. It is commonly a ſingle muſcle, but is ſometimes found double. It is fixed above by fleſhy fibres to all the ſharp ridge, or criſta of the os pubis, and to a ſmall part of the oblong notch, or depreſſion on the fore ſide of the criſta, in which the upper extremity of this muſcle is lodged; from thence it runs down obliquely towards the little trochanter, under, and a little behind which, it is inſerted obliquely by a flat tendon between the ſuperior inſertion of the vaſtus internus, and inferior inſertion of the triceps ſecundus, with which it is united.

SECTION. (*Dict.*) *Cæſarean* SECTION. See the article CÆSAREAN SECTION.

SEDITION, among civilians, is uſed for an irregular commotion of the people, or an aſſembly of a number of citizens without lawful authority, tending to diſturb the peace and order of the ſociety. This offence is of different kinds: ſome *ſeditions* more immediately threatening the ſupreme power, and the ſubverſion of the preſent conſtitution of the ſtate; others tending only towards the redreſs of private grievances. Among the Romans, therefore, it was variouſly puniſhed, according as its end and tendency threatened greater miſchief. In the puniſhment, the authors and ringleaders were juſtly diſtinguiſhed from thoſe, who with leſs wicked intention joined, and made part of the multitude. The ſame diſtinction holds in the law of England, and in that of Scotland. Some kinds of ſedition in England amount to high-treaſon, and come within the ſtat. 25 Edw. III. as levying war againſt the king. And ſeveral ſeditions are mentioned in the Scotch acts of parliament as treaſonable. The law of Scotland makes riotous and tumultuous aſſemblies a ſpecies of ſedition. But the law there, as well as in England, is now chiefly regulated by the riot act, made 1 Geo. I. only it is to be obſerved, that the proper officers in Scotland, to make the proclamation thereby enacted, are ſheriffs, ſtewards, and bailies of regalities, or their deputies; magiſtrates of royal burroughs, and all other inferior judges and magiſtrates; high and petty conſtables, or other officers of the peace in any county, ſtewartry, city or town. And in that part of the iſland, the puniſhment of the offence is death and confiſcation of moveables: in England it is felony. See the article RIOT.

SELTZER-*water*, the name of a mineral-water of Germany, which ariſes near Neider Seltz, and is now uſed in England and many other countries. We called it ſeltz, or ſaltzer-water, and the phyſicians preſcribe it in many caſes, as ſcurvies, ſpaſmodic affections, and in conſumptions; in the laſt caſe, mixing it with aſſe's milk.

SHEW-

SHEW-BREAD, among the Hebrews, the name given to thoſe loaves of bread which the prieſts placed every ſabbath-day upon the golden table in the ſanctuary. The ſhew-bread conſiſted of twelve loaves, according to the number of the tribes; theſe were ſerved up hot on the ſabbath-day, and at the ſame time the ſtale ones which had been expoſed all the week were taken away. It was not lawful for any one to eat of thoſe loaves but the prieſts only: this offering was accompanied with ſalt and frankincenſe, which was burnt upon the table at the time they ſet on freſh loaves.

SIDERIA, in natural hiſtory, the name of a genus of cryſtal, uſed to expreſs thoſe altered in their figure by particles of iron. Theſe are of a rhomboidal form, and compoſed only of ſix planes. Of this genus there are four known ſpecies: 1. A colourleſs, pellucid, and thin one, found in conſiderable quantities among the iron-ores of the foreſt of Dean in Glouceſterſhire, and in other the like places. 2. A dull, thick, and brown one, not uncommon in the ſame places with the former. And 3. A black and very gloſſy kind, a foſſil of very great beauty, found in the ſame place with the others, as alſo in Leiceſterſhire and Suſſex. See the article CRYSTAL.

SIDEROCHITA, in natural hiſtory, a name which Dr. Hill gives to a claſs of foſſils of a moderately firm and compact texture, and cruſtated ſtructure, compoſed of ferrugineous, mixed with earthy matter, and formed of repeated incruſtations, making ſo many coats or cruſts round a ſofter or harder nucleus; or round looſe earths, or an aqueous fluid. Of this claſs there are two orders, and under theſe four genera. The firſt order is of thoſe ſiderochita which contain regular and ſolid nuclei, and comprehends the empherepyra, and the heteropyra. The ſecond order is of thoſe ſiderochita, which contain no ſolid nucleus but looſe earthy matter, in form of powder, or an aqueous fluid, and comprehends the godes and the enhydrie. See the article EMPHEREPYRA, &c.

SIGN. (*Dict.*) SIGN in algebra, denotes a ſymbol or character. See CHARACTER. Mr. Mac Laurin obſerves, that the uſe of the negative ſign, in algebra, is attended with ſeveral conſequences that at firſt ſight are admitted with difficulty, and has ſometimes given occaſion to notions that ſeem to have no real foundation. This ſign implies that the real value of the quantity repreſented by the letter to which it is prefixed, is to be ſubſtracted; and it ſerves with the poſitive ſign, to keep in view what elements or parts enter into the compoſition of quantities, and in what manner, whether as increments, or decrements, (that is, whether by addition or ſubſtraction) which is, of the greateſt uſe in this art. See the article POSITIVE.

In conſequence of this, it ſerves to expreſs a quantity of an oppoſite quality to the poſitive, as a line in a contrary poſition; a motion with an oppoſite direction; or a centrifugal force in oppoſition to gravity; and thus often ſaves the trouble of diſtinguiſhing, and demonſtrating ſeparately, the various caſes of proportions, and preſerves their analogy in view. But as the proportion of lines depends on their magnitude only, without regard to their poſition; and motions, and forces, are ſaid to be equal, or unequal, in any given ratio, without regard to their directions: and, in general, the proportion of quantities relates to their magnitude only, without determining whether they are to be conſidered as increments or decrements; ſo there is no ground to imagine any other proportion of $-b$ and $+a$, (or of -1 and 1) than that of the real magnitudes of the quantities repreſented by b and a, whether theſe quantities are, in any particular caſe, to be added, or ſubſtracted. It is the ſame thing to ſubſtract a decrement as to add an equal increment, or to ſubſtract $-b$ from $a-b$, as to add $+b$ to it. and becauſe multiplying a quantity by a *negative* number implies only a repeated ſubſtraction of it, the multiplying $-b$ by $-n$, is ſubſtracting $-b$ as often as there are units in n; and is therefore equivalent to adding $+b$ ſo many times, or the ſame as adding $+nb$. But if we infer from this, that 1 is to $-n$ as $-b$ to nb, according to the rule, that unit is to one of the factors as the other factor is to the product, there is no ground to imagine that there is any myſtery in this, or any other meaning than that the real magnitudes repreſented by 1, n, b, and nb are proportional. For that rule relates only to the magnitude of the factors and product, without determining whether any factor, or the product, is to be added, or ſubtracted. But this

this likewiſe muſt be determined in algebraic computations; and this is the proper uſe of the rules concerning the ſigns, without which the operation could not proceed. Becauſe a quantity to be ſubſtracted is never produced in compoſition, by any repeated addition of a poſitive, or repeated ſubſtraction of a negative, a negative ſquare-number is never produced by compoſition from the root. Hence $\sqrt{-1}$, or the ſquare root of a negative, implies an imaginary quantity; and, in reſolution, is a mark or character of the impoſſible caſes of a problem, unleſs it is compenſated by another imaginary ſymbol, or ſuppoſition, when the whole expreſſion may have a real ſignification. Thus $1+\sqrt{-1}$, and $1-\sqrt{-1}$ taken ſeparately, are imaginary, but their ſum is 2; as the conditions that ſeparately would render the ſolution of a problem impoſſible, in ſome caſes deſtroy each other's effect, when conjoined. In the purſuit of general concluſions, and of ſimple forms for repreſenting them, expreſſions of this kind muſt ſometimes ariſe where the imaginary ſymbol is compenſated in a manner that is not always ſo obvious. See QUANTITY, POWER, &c.

By proper ſubſtitutions, however, the expreſſion may be transformed into another, wherein each particular term may have a real ſignification, as well as the whole expreſſion. The theorems that are ſometimes briefly diſcovered by the uſe of this ſymbol, may be demonſtrated without it, by the inverſe operation, or ſome other way; and though ſuch ſymbols are of ſome uſe in the computations by the method of fluxions, its evidence cannot be ſaid to depend upon arts of this kind.

SILESIAN-EARTH, *terra ſileſiaca*, in the materia medica, a fine aſtringent bole, called by ſome authors axungia ſolis. It is very heavy, of a firm compact texture, and in colour of a browniſh yellow. It breaks eaſily between the fingers, and does not ſtain the hands, is naturally of a ſmooth ſurface, and is readily diffuſible in water, and melts freely into a butter-like ſubſtance in the mouth. It leaves no grittineſs between the teeth, and does not ferment with acid menſtrua. Theſe are the characters by which it is known from all other earths of a like colour. It is found in the perpendicular fiſſures of rocks near the gold-mines at Strigonium in Hungary, and is ſuppoſed to be impregnated with the ſulphur of that metal. It is, however that be, a good aſtringent, and better than moſt of the boles in uſe.

Montanus gives us a high character of its virtues, and ſays, it is gold tranſmuted by nature into an admirable medicine. Sennertus commends it as excellent againſt malignant fevers, diarrhœas, &c. Agricola tells us, that the ſpirit of this earth diſſolves gold, as well as aqua regia, though more ſlowly, into a red ſolution; which, in a few days, precipitates the gold in fine powder. He alſo mentions another earth found at Weſterwald, preferable to this Sileſian earth.

SILEX, the *flint*, in natural hiſtory. See the article FLINT.

SINOPICA *terra*, in natural hiſtory, the name of a red earth of the ochre-kind, called alſo rubrica ſinopica, and by ſome authors ſinopis. It is a very cloſe, compact, and weighty earth, of a fine glowing purple colour, but in ſome ſpecimens much deeper than in others, and in ſome degenerating into paleneſs; but even in its worſt condition, it is a very fine colour. It is of a pure texture, but not very hard, and of an even, but duſty ſurface. It adheres firmly to the tongue, is perfectly fine and ſmooth to the touch, does not crumble eaſily between the fingers, and ſtains the hands. It melts very ſlowly in the mouth, and is perfectly pure and fine, and of a very auſtere aſtringent taſte, and ferments very violently with aqua fortis. It was dug in Cappadocia, and carried for ſale to the city Sinope, whence it had its name. It is now found in plenty in the New Jerſeys in America, and is called by the people there blood-ſtone, from its ſtaining the hands to a blood-colour, and may probably be had in many other places; and this deſerves thoroughly enquiring into, ſince there ſeems not one among the earths more worthy notice. Its fine texture and body, with its high florid colour, muſt make it very valuable to painters, and its powerful aſtringency equally ſo in medicine. The antients were well acquainted with it in fluxes and hæmorrhages, and experience ſhews it poſſeſſes the ſame virtues at this time. The deepeſt coloured is ever the moſt aſtringent.

SKINK, or ALSCHARCUR, in zoology, and the materia medica, a ſmall animal of the lizard kind, brought to us dry from

from Egypt, and recommended as a great reſtorative. See the article LIZARD. Whatever virtues this medicine may have freſh, as uſed by the Egyptians, it is obſerved, that it has none as it comes to us, and ſerves uſeleſsly to increaſe the articles of the mithridate. See MITHRIDATE.

SPINE. (*Dict.*) SPINES *of echini*, in natural hiſtory. Theſe in their foſſile ſtate make a great appearance in the cabinets of the curious, and in the works of the learned, and are of an almoſt infinite variety of kinds; and many of them are of the ſame figures and dimenſions with thoſe of the echini now living in our own and other ſeas, and well known to us. But beſide theſe, there are an almoſt infinite variety of others, which though allowed on all hands to be truly ſpines of ſome echini or other, yet evidently differ from thoſe of all the known recent fiſh of that name, and have certainly belonged to ſpecies of it, which we have not yet the leaſt knowledge of. Theſe, however different in ſhape from one another, yet all agree in their texture and conſtituent matter, both with one another, and with the foſſile remains that ſupply the places of the ſhells of the other ſpecies ſo common in our chalk-pits, all being compoſed of a plated, or tabulated ſpar. Both theſe ſhells and the ſpines, though they retain every outer lineament of the bodies they owe their form to, yet have they nothing of their interior texture, nor any the leaſt reſemblance of it, but are compoſed of plates ſet edgewiſe, or aſlant, in the ſhells, and in the ſpines always obliquely to the axis of the body; ſo that all the foſſile ſpines of echini break regularly in an oblique direction, and always ſhew on each part a perfectly ſmooth, and gloſſy, ſlanting ſurface.

Of the foſſile ſpines of echini ſome are long and ſlender, tapering from a broader baſis to a fine point, and ſometimes from a thick part, at or near the middle, to an obtuſe point at each end: theſe are uſually ſtriated, ridged, or furrowed, and often elegantly granulated, though ſometimes they are ſmooth. Theſe moſt reſemble the ſpines of the more common ſpecies of recent or living echini we are acquainted with; others of them are of the ſame length with the common long ones, but are very flat, and are ridged more or leſs high, or covered with tubercles of different ſhapes; others are ragged, and variouſly jagged, and knotted like a rough branch of fir, ſtript of its leaves, or that ſort of fucus called the ſea-ragged-ſtaff. The ſpines themſelves are uſually bedded in the ſtrata of chalk, though ſometimes they are found in the ſtone-quarries, and ſometimes, but that moſt rarely, bedded in clay, or looſe among gravel.

STALACTOCIBDELA, in natural hiſtory, the name of a genus of ſpars, formed by the dropping of water from the roofs of ſubterranean caverns; being the coarſer kinds of what authors have called ſtalactitæ. Theſe are cryſtallino-terrene ſpars, formed into oblong bodies, and found hanging from the roofs of caverns and grottos. See SPAR.

Of this genus there are only two known ſpecies. 1. A browniſh, friable one, common in our ſubterranean caverns, and even on the inſides of new-built ſtone-arches, as thoſe of the new bridge at Weſtminſter. And, 2. A ſnow-white, friable one, found in ſubterranean caverns in England and Germany, and even on modern-built brick-arches, as has of late been found on opening the vault under the terrace at Windſor. This, and the preceding inſtance, give us unqueſtionable evidence of the preſent, and daily formation of theſe bodies.

STALAGMITÆ. See the article STALAGMOSCIERIA.

STALAGMODIAUGIA, in natural hiſtory, the name of a genus of ſpars, being the purer kinds of what authors call ſtalagmitæ, or drop-ſtones. See SPAR.

Theſe are ſpars found in form of ſmall balls, each compoſed of numerous cruſts, and conſiderably pellucid and cryſtalline. Of this genus there are three known ſpecies. 1. A white one, with numerous, thin cruſts, and a ſmooth ſurface, found in many parts of Germany, and in England. 2. A greyiſh, white one, with thicker cruſts, and a rougher ſurface. And, 3. A yellow, thin-cruſted one, with an echinated ſurface. Theſe are both found in the ſubterranean caverns of England, and many other places, and the former of them is the confetti di tivoli of the Italians.

STALAGMOSCIERIA, in natural hiſtory, the name of a genus of opake ſpars, which have received their form from the dropping of water. See SPAR.

The bodies of this genus are the coarſer kinds

kinds of what are called by authors ſtalagmitæ, and are ſmall round maſſes, compoſed of numerous, thin cruſts, and of an opake and coarſe ſtructure. Of this genus we have only two known ſpecies. 1. A ſmall, browniſh, white one, with a ſmooth coat, found in Saxony, and ſome parts of England. And, 2. A ſmall, browniſh, white one, with thin cruſts, and a large nucleus. This is found in ſmall maſſes in Yorkſhire, and is the ſubſtance of which the famous Ketton-ſtone of Rutland is compoſed. Scotland affords a vaſt variety of the ſtalagmitæ. One cave, about eight miles diſtant from Aberdeen, on the ſea-ſide, has its whole roof cruſted over with ſtalactitæ, of a foot in length, hanging down like the fringe of a bed. The floor alſo is as deep covered with congeries of ſtalagmitæ. The upper coat, both of theſe and the ſtalactites, is of a ſea-colour, but the inner parts are as white as ſal prunellæ. The water, which drops from theſe, is of a very peculiar nature; for it is ſo acrimonious, that if it touch the ſkin but ever ſo ſlightly, it makes it ſmart. Near this cave there is another hollow rock, in which the ſtalactitæ make a very beautiful figure: they are all formed into long and thick columns, and ſtand perpendicularly, ſo that they repreſent the pipes of an organ; when broken, they are all found to be hollow within. The rock, and all the ſtone thereabouts, is of the lime-ſtone kind.

STANNUM, TIN. See the article TIN.

STAPHYLOMA, in ſurgery, the name of a diſtemperature of the eye, which is of two kinds: in one, the cornea is more than uſually protuberant; and in the other, the uvea breaks forth, and forms an unſightly tumour on the cornea, either from internal cauſes, or from ſome wounding inſtrument forced through the coat; in which laſt caſe, the ſight of the eye is uſually deſtroyed. This is a very dangerous diſorder, as it not only deforms the face, and deſtroys the ſight of the eye, but very often it induces violent inflammations, head-achs, reſtleſneſs, abſceſſes, and ſometimes a cancer in thoſe parts. In the cure of this diſorder, the tumour and deformity are to be relieved, according to Heiſter, by the application of compreſſes dipped in alum-water, together with a plate of lead and a bandage, or ſome proper inſtrument. If the uvea protrudes itſelf thro' a wound in the cornea, it ſhould be returned with a probe: the patient muſt be ordered to lie in a ſupine poſture; and the wound muſt conſtantly be dreſſed with the white of an egg, and a mucilage of quince-ſeeds, till it is healed; by this means the ſight is often reſtored.

If this diſorder is become inveterate and inflexible to all remedies, a needle, armed with a double thread, muſt be paſſed through the middle of the tumour, and the two ends of the thread are then to be tied on a knot, firſt on one ſide, and then on the other, by which means the tumour will gradually wither, and fall off along with the threads; but as this method occaſions a continued pain, and from thence ſometimes ariſe inflammations, it is better ſtill to cut off the tumour with a ſcalpel, or ſciſſors.

STEATITES, in the hiſtory of foſſils, a name given by late authors to a ſubſtance called, in Engliſh, ſoap-earth, and which, though the authors on theſe ſubjects had not taken notice of that circumſtance, was the very ſubſtance called cimolia purpuraſcens, or purple earth of Cimolus, by the antients. The later ages, finding the purple cimolian earth of the old writers to be wholly different from their white kind, have given that name (though it is not eaſy to gueſs why) to the common fuller's earth, which has no tinge of purple in its whole ſubſtance. This earth however, called by us ſoap-earth, and ſteatites, is well worth enquiring after, as a ſubſtance for imitating the fine porcelain ware of China. Dr. Woodward much recommends it on this account, and repeated trials have been made of it ſince his time, and ſome of them very lately; in all which it has afforded the fineſt earthen-ware ever made with us, and promiſes fair, with good management, for the equaling any in the world. It is dug in many parts of Devonſhire and Cornwall, and the neighbouring counties; the cliff of the Lizard-point is almoſt wholly compoſed of it, and the adjacent little iſlands abound with it; and from all theſe places it might be brought, at ſmall expence, in any quantities. It is known from all other earths by theſe characters: it is compoſed of extremely fine particles, and is of a firm, equal, and regular texture, and great weight. It is very firm and hard as it lies in the earth, but when it has been ſome time expoſed to the air, it becomes almoſt of a ſtony hardneſs.

It

It is of a perfectly fine, ſmooth, and gloſſy ſurface, ſofter to the touch than any other ſpecies of earth, and does not at all adhere to the tongue, or ſtain the fingers in handling; but drawn along a rough ſurface, as a piece of cloth, or the like, it marks it with a fine and even white line. In colour it is a clear white, veined and variegated very beautifully with purple of different degrees of deepneſs, and is of ſo fine a ſtructure of parts, that when cut into thin pieces it is in ſome degree tranſparent. It makes no effervescence with acids, and burns to a pure white, even in its purple parts.

STEGANIUM, SLATE, in foſſile hiſtory. See the article SLATE.

STING. (*Dict.*) Heiſter aſſures us, that the beſt cure for the ſting of bees or waſps is to anoint the part with vinegar mixed with theriaca; or theriaca mixed with ſpirit of wine; or armenian bole with vinegar.

STINT, in zoology, the name of a ſmall bird common about the ſea-ſhores in many counties of England, and ſeeming to be the ſame with the cinclus prior of Aldrovand, and the ſchæniclos, or junco of Bellonius, called by the French *alouette de mer*, the ſea-lark. See ALAUDA.

It is ſomewhat ſmaller than the common lark, and in ſhape reſembles the ſmaller ſnipe. Its beak is black, ſlender, and ſtrait; its feet of a greeniſh, or browniſh black; its back is grey, variegated with oblong, black ſpots, and its wings ſomewhat of a reddiſh brown; its neck is grey, and its head variegated with black and a reddiſh brown; its wings are long, and when folded reach beyond the end of the tail; and its rump is ſomewhat reddiſh, with black ſtreaks.

STOCKS. (*Dict.*) STOCKS in commerce. See STOCK-JOBBING and CAPITAL.

STRENGTH. (*Dict.*) Notwithſtanding the ſtrengths of the ſame animal at different times, or of different animals of the ſame ſpecies, are in proportion to the quantities of the maſs of their blood, yet the quantity of the blood may be increaſed in ſuch circumſtances, as to abate the ſtrength. The equilibrium between the blood and the veſſels being deſtroyed, wonderfully leſſens the ſtrength. The ſudden ſuppreſſion of perſpiration, tho' it increaſes the quantity of the blood, as it moſt conſiderably does by Sanctorius's calculation, yet it leſſens the ſtrength, becauſe the retained matter, being what ought to be evacuated, ſo alters the texture of the blood, as to make it unfit for muſcular motion. See the article PERSPIRATION, *&c.*

Bellini proves, that if the blood be ſo vitiated, as to increaſe or diminiſh ſtrength, it amounts to the ſame, as if the blood were in a natural ſtate, but its quantity increaſed or diminiſhed in the ſame proportion; ſo that the blood, when vitiated, may ſo impair the ſtrength of the muſcles, as even to ſpoil digeſtion; and yet, in ſome caſes, it may be ſo vitiated, as to help digeſtion, and increaſe ſtrength. See BLOOD, MUSCLE, *&c.*

M. de la Hire, in a calculation of the ſtrength of a man in drawing and bearing, ſhews, that the ſtrength of an ordinary man, walking in an horizontal direction, and with his body inclining forwards, is only equal to twenty-ſeven pounds, which is much leſs than one would have imagined. He adds, that this force would be much greater, if the man were to walk backwards; and that it is for this reaſon, the watermen fetch their oars from before backwards. It is known, by experience, that a horſe draws horizontally as much as ſeven men, conſequently his ſtrength muſt be 189 pounds. A horſe, as to puſhing forwards, has a great advantage over a man, both in the ſtrength of its muſcles, and the diſpoſition of its whole body; but the man has the advantage over the horſe in aſcending. M. de la Hire ſhews, that three men, laden with 100 pounds a-piece, will aſcend a pretty ſteep hill with more eaſe and expedition than a horſe laden with 300 pounds.

Dr. Deſaguliers ſhews, from a variety of experiments, that pretended feats of ſtrength is wholly owing to art, and accounts for them as not exceeding the power of any man of moderate ſtrength. See Deſagulier's Experimental Philoſophy, vol. I. page 265, ſeq.

For the manner of calculating the ſtrength of timber, ſee TIMBER.

For the ſtrength of ſpirits, ſee the articles PROOF, BRANDY, *&c.*

STRIGONENSIS TERRA, *earth of Strigonium*, in the materia medica, a red earth, of the bole kind, found about the gold-mines at Strigonium in Hungary, and uſed in ſome places as an aſtringent and ſudorific. See the article BOLE.

The characters by which it is known from the other earths are theſe: It is but of a coarſe and impure texture, and lighter than moſt of the boles in colour; it is of a ſtrong, but dull red, and is of

a tolerably ſmooth ſurface; it is apt to crumble to pieces between the fingers, and ſtains the ſkin in handling; it melts freely in the mouth, and has a remarkable ſmoothneſs, but very little aſtringency in its taſte, and leaves a ſenſible grittineſs between the teeth; it is ſometimes veined and ſpotted with ſmall moleculæ of an earth, like the whitiſh variegations of the red french bole.

SYMPEXIUM, in natural hiſtory, a genus of ſtones, of a fine, cloſe, compact, and firm texture, and of a plain, uniform ſtructure, ſplitting with equal eaſe in any direction. See the article STONE. Of this genus there are four different kinds, under each of which are reckoned ſeveral ſpecies. 1. The white, or whitiſh rock-ſtone comprehends the denſe, dull-looking, whitiſh ſympexium; the hard, greyiſh, white, dull ſympexium; the hard, porous ſympexium; the hard, bright, grey ſympexium; the hard, bright, browniſh, white ſympexium; the dull, yellowiſh, white, hard ſympexium; the dull, hard, browniſh, white ſympexium; the whitiſh, grey, marbly ſympexium; the yellowiſh, white, flinty ſympexium; and the browniſh, white, flinty ſympexium. 2. The bluiſh ſympexium comprehends the bluiſh, flinty ſympexium; the hard, bluiſh ſympexium; and the browniſh, blue, dull, hard ſympexium. 3. The reddiſh comprehends the dull, pale, red ſympexium; the hard, ſhining, red ſympexium; and the green and red, variegated ſympexium. 4. The black comprehending the hard, black, dull ſympexium; the hard, black, ſhining ſympexium; and the ſoft, dull, black ſympexium.

T.

TAPLINGS, in the engliſh ſalt-works, the name given to certain bars of iron, which ſupport the bottom of the pan in which the brine is boiled. See the article SALT.

Theſe pans are very large, and cover a wide furnace; but as their width would make them apt to bend in the middle, which would ſpoil the working of the ſalt, there is a ſort of wall made of brick carried along the middle of the furnace, and on the top of this are placed theſe taplings; they are about eight inches high, and from four to ſix in thickneſs, being ſmalleſt at the top. Theſe are placed at about three foot diſtance one from another, and the wall which ſupports them, and which is called the midfeather, is broad at the baſe, and ſo narrow at the top, as barely to give room for the baſes of the taplings.

TARANTOLA-FISH, a ſpecies of oſmerus, with eleven rays in the pinna ani. See the article OSMERUS.

This fiſh is of the ſize of the ſmelt, or larger; the body is rounded, and the belly flat; its thickneſs is about that of a man's thumb, when its length is ſeven inches; the belly is white, the head is flatted, and there is a little furrow between the eyes; the opening of the mouth is very large, and the roſtrum acute; there is in each jaw a ſingle ſeries of long teeth on each ſide of the palate; the back fin has twelve rays, and there is towards the extremity of the back a membranous appendage of the appearance of a fin, but without any rays: the pectoral fins have each thirteen rays.

TARRAGON, *dracunculus*, in botany, the engliſh name of the linear-leaved artemiſia. See the article ARTEMISIA.

TEETH. (*Dict.*) Foſſile teeth of fiſhes are known by three names; the gloſſopetræ, the bufonitæ, and the plectronitæ, See the article GLOSSOPETRÆ, *&c.*

TELAUGIA, in natural hiſtory, a genus of ſcrupi, of a glittering appearance, uſually containing flakes of talc, and emulating the ſtructure of the granites. See the article SCRUPI.

Of this genus Dr. Hill reckons no leſs than twelve ſpecies. 1. The hard, ſhining, black, and white telaugium. 2. The hard, ſhining, red, and white telaugium. 3. The red telaugium, variegated with white and black. 4. The hard, heavy telaugium, of a greyiſh-black, variegated with white. 5. The browniſh, red telaugium, variegated with white and yellowiſh. 6. The reddiſh, white telaugium, variegated with black and

and a gold colour. 7. The hard, white telaugium, variegated with brown. 8. The bluiſh, white, brittle telaugium. 9. The brown, friable telaugium, variegated with yellow. 10. The hard, purpliſh, brown telaugium, variegated with white and yellow. 11. The heavy, red telaugium, variegated with black and white. And, 12. The hard, bluiſh, green telaugium, variegated with white.

TEMACHIS, in natural hiſtory, the name of a genus of foſſils, of the claſs of the gypſums, the characters of which are theſe: It is of a ſofter ſubſtance than many of the other genera, and of a very bright and glittering hue. See the article GYPSUM.

The bodies of this genus are compoſed of an aſſemblage of multitudes of irregular, flaky fragments, as are all the gypſums; but no genus of them ſo viſibly ſo as this. There are but three known ſpecies of this genus. 1. A ſoft, ſhining, green one. 2. A ſoft, white one, of a marbly appearance. And, 3. A pale, brown, gloſſy one. The firſt is found in great plenty on the ſhores of rivers in the Eaſt-Indies; and though not known as a ſubſtance that would make a plaſter by burning, is given internally in nephritic caſes, being powdered without calcination. The ſecond is found in many parts of Derbyſhire, and is uſed for burning into plaſter for ſtuccoing of rooms, and caſting ſtatues, *&c.* And the third is found in Germany; and, beſide its common uſes in ſtuccoing and caſting, is in great eſteem among the metallurgiſts and aſſayers, for the making either ſingly or in mixture with bone-aſhes, their teſts. See the article TEST.

We have not this ſpecies in England ſo far as is yet known.

TETRADECARHOMBIS, in natural hiſtory, the name of a genus of foſſils, of the claſs of the ſelenitæ, expreſſing a rhomboidal body, conſiſting of fourteen planes. See the article SELENITÆ.

The characters of this genus are, that the bodies of it are exactly of the ſame form with the common ſelenitæ; but that in theſe each of the end-planes is divided into two, and there are, by this means, eight of theſe planes inſtead of four. Of this genus there are only three known ſpecies. 1. A thin, pellucid one, with tranſverſe filaments, which is frequent in the clay-pits of Northamptonſhire, and ſome other counties. 2. A dull, thicker kind, with very ſlender, tranſverſe filaments: this is a very rare ſpecies, and found, as far as is yet known, only in Leiceſterſhire in the yellow brick-clay, and at ſmall depths. And, 3. A large ſcaly kind, conſiderably long, and of a very rough ſurface: this is found in Yorkſhire, and that ſometimes looſe, on the ſides of the hills, but more frequently buried in the ſtrata of clay.

TETRAPTERA, in the hiſtory of inſects, a name given to that order of inſects, which have four wings. See the article INSECT.

The inſects of this order are very numerous, and have certain evident diſtinctions in the ſtructure of their wings, and are thence arranged under five claſſes; *viz.* the coleoptera, ſcleroptera, neuroptera, lepidoptera, and hyrnenoptera. See article COLEOPTERA, *&c.*

TETRAPYRAMIDIA, in natural hiſtory, the name of a genus of ſpars, influenced in their ſhape by an admixture of particles of tin, and found in form of broad-bottomed pyramids of four ſides. See the article SPAR.

Of this genus there is only one known ſpecies, which is uſually of a browniſh colour, and found in Saxony, as alſo in Devonſhire, Cornwall, and other counties of England, where there is tin.

THERIACA. (*Dict.*) The theriaca andromachi is a reform of mithridate, made by Andromachus, phyſician to Nero; for the virtues whereof, ſee the article MITHRIDATE.

THRAUSTOMICTHES, in natural hiſtory, the name of a genus of compound earths, the bodies of which are loams compoſed of ſand and a leſs viſcid clay, and are therefore of a friable or crumbly texture. See the article EARTH.

The earths of this genus are generally uſed to make bricks, and there are ſeveral ſpecies of them. 1. A whitiſh one, dug in great plenty in Staffordſhire, and ſome other counties. 2. A browniſh white one, very plentiful about London. 3. A pale yellow one, common in moſt parts of England, at ſmall depths, 4. A ſharp rough one, of a deep yellow, dug near the town of Hedgerley, near Windſor, and commonly called Windſor-loam; it is not found in any other place, and is of great value; it makes the bricks uſed for the iron-furnaces, and ſerves at the glaſs-houſes; and among the chemiſts, as a very ſtrong and valuable lute; and is not only uſed in England, but carried to Holland and Germany,

many, and many other parts of the world. 5. A deep, dusky, yellow one, dug in most parts of England, near the surface. 6. A hard, brown one, found at some depth in Buckinghamshire, and usually found full of small shells; it is used for covering the ridges of barns, and copings of walls; and makes very firm and durable barn-floors. 7. A light, pale, brown one, the loosest and most friable of all the species, used in many places for making the bell-founders moulds. 8. A yellowish, brown one: this is common in most parts of the kingdom, and makes the fine red bricks, used for ornamenting buildings.

THRUPTOMICTHES, in natural history, a genus of earths, consisting of moulds of a lax, friable texture. See the articles EARTH and MOULD.

Of this genus there are only two species. 1. The red thruptomicthes, frequent in many counties; but no where more plentifully than about Rowel, in Northamptonshire: it is accounted a very fertile, good land, and, particularly, succeeds with crops of rye, barley, or pease. 2. The friable, brown thruptomicthes, frequent in Suffex, and in many other parts of the kingdom, and is generally accounted a poor, barren land.

THUNDERING LEGION, *legio fulminans*, was a legion in the roman army, consisting of christian soldiers, who, in the expedition of the emperor Marcus Aurelius against the Sarmatæ, Quadi, and Marcomanni, saved the whole army then ready to perish of thirst, by procuring, with their prayers, a very plentiful shower thereon, and at the same time a furious hail, mixed with lightening and thunder-bolts, on the enemy. See the article LEGION.

This is the account commonly given by ecclesiastical historians, and the whole history is engraven in bass-relievo's on the antonine column. And hence arose the denomination thunderers, tho' some say, that the legion, those christians were of, was called the thundering legion before.

THYITES, in the materia medica, the same with the lapis morochthus. See the article LAPIS.

THYROSTAPHYLINUS, in anatomy, the name of a muscle of the uvula, which, arising from the lateral part of the thyroide cartilage, and ascending towards the uva, becomes larger and is inserted in manner of an arch, in the side of the velum palatinum.

TICKLISH, in the manege. A horse is said to be tickliſh, that is too tender upon the spur, and too sensible; that does not freely fly the spurs, but in some measure resists them, throwing himself up, when they come near and prick his skin. A tickliſh horse has somewhat of the ramingues, *i. e.* the kickers against the spurs; but with this difference, that the latter put back, leap and kick, and yerk out behind, in disobeying the spurs; whereas a tickliſh horse only resists for some time, and afterwards obeys, and goes much better, through the fear of a vigorous ham, when he finds the horseman stretch his leg, than he does upon being actually pricked.

TILE, or TYLE, (*Dict.*) in assaying, a small flat piece of dried earth, used to cover the vessels in which metals are in fusion. Cramer directs, that these be made of a mixture of clay and sand, or powder of flints, or broken crucibles, formed into a paste, and spread thin with a rolling-pin on a table, or flat stone. From these cakes or plates, pieces are to be cut with a knife, to the shape and size of the mouths of the vessels to be closed. It is best then to pare away the borders of the under surface of the piece thus cut off, that this surface may immediately touch all the way the edge of the mouth of the vessel, leaving a prominent rim, by which means the tile sits close upon the vessel, and is not so easily displaced by accidents, as a touch of the poker, or of the coals put on to mend the fire, as it otherwise would be. Finally, put on the middle of the outer surface a small bit of the same matter, which serves as a kind of handle, by means of which it may be conveniently managed by the tongs, and easily taken off and put on again at pleasure.

TINGING *of marble*. The art of doing this has, in several peoples hands, been a very lucrative secret, though there is scarce any thing in it that has not at one time or other been published. Kircher has the honour of being one of the first, who published any thing practicable about it. This author, meeting with stones in some cabinets supposed to be natural, but having figures too nice and particular, to be supposed of nature's making, and these not only on the surface, but sunk through the whole body of the stones,

was at the pains of finding out the artiſt, who did the buſineſs; and on his refuſing to part with the ſecret on any terms, this author, with Albert Gunter, a Saxon, endeavoured to find it out; in which they ſucceeded at length very well. The method is this: Take aqua fortis and aqua regia of each two ounces, ſal armoniac one ounce, ſpirit of wine two drams, about twenty-ſix grains of gold, and two drams of pure ſilver; let the ſilver be calcined and put into a vial, and pour upon it the aqua fortis; let this ſtand ſome time, then evaporate it, and the remainder will firſt appear of a blue and afterwards of a black colour. Then put the gold into another vial, pour the aqua regia upon it, and when it is diſſolved, evaporate it as the former. Then put the ſpirit of wine upon the ſal armoniac, and let it be evaporated in the ſame manner. All the remainders, and many others made in the ſame manner from other metals, diſſolved in their proper acid menſtrua, are to be kept ſeparate, and uſed with a pencil on the marble. Theſe will penetrate without the leaſt aſſiſtance of heat, and the figure being traced with a pencil on the marble, the ſeveral parts are to be touched over with the proper colours, and this renewed daily till the colours have penetrated to the deſired depth into the ſtone. After this, the maſs may be cut into thin plates, and every one of them will have the figure exactly repreſented on both ſurfaces, the colours never ſpreading. The niceſt method of applying theſe, or the other tinging ſubſtances, to marble, that is to be wrought into any ornamental works, and where the back is not expoſed to view, is to apply the colours behind, and renew them ſo often till the figure is ſufficiently ſeen through the ſurface on the front, though it does not quite extend to it. This is the method that, of all others, brings the ſtone to a nearer reſemblance of natural veins of this kind.

TOLLENON, among the Romans, a warlike machine, formed in this manner: one beam was fixed very deep in the earth, and on the top of it another, more than twice as long, and moveable upon a center; on one end of this croſs-beam were placed a covering of hurdles or planks, within which a few ſoldiers were put, and by pulling down the other end with ropes, theſe were raiſed above the walls of a beſieged town.

TRACHEOTOMY, in ſurgery, the name of an operation otherwiſe called bronchotomy. See BRONCHOTOMY.

TRACING, or TRAINING, in mineralogy. See the article TRAINING.

TRANSFORMATION, in general, denotes a change of form, or the aſſuming a new form different from a former one. The chemiſts have been for a long time ſeeking the transformation of metals; that is, their tranſmutation, or the manner of changing them into gold. See the article TRANSMUTATION.

TRANSFORMATION *of equations*. The doctrine of the transformation of equations, and of exterminating their intermediate terms, is thus taught by Mr. Mac Laurin. The affirmative roots of an equation are changed into negative roots of the ſame value, and the negative roots into affirmative, by only changing the ſigns of the terms alternately, beginning with the ſecond. Thus, the roots of the equation $x^4 - x^3 - 19x^2 + 49x - 30 = 0$ are $+1, +2, +3, -5$; whereas the roots of the ſame equation having only the ſigns of the ſecond and fourth terms changed, *viz.* $x^4 + x^3 - 19x^2 - 49x - 30 = 0$, are $-1, -2, -3, +5$.

To underſtand the reaſon of this rule, let us aſſume an equation, as $\overline{x-a} \times \overline{x-b} \times \overline{x-c} \times \overline{x-d} \times \overline{x-e}$, &c. $= 0$, whoſe roots are $+a, +b, +c, +d, +e$, &c. and another having its roots of the ſame value, but affected with contrary ſigns, as $\overline{x+a} \times \overline{x+b} \times \overline{x+c} \times \overline{x+d} \times \overline{x+e}$, &c. $= 0$. It is plain, that the terms taken alternately, beginning from the firſt, are the ſame in both equations, and have the ſame ſign, being products of an even number of the roots; the product of any two roots having the ſame ſign as their product when both their ſigns are changed; as $+a \times -b = -a \times +b$.

But the ſecond terms and all taken alternately from them, becauſe their coefficients involve always the products of an odd number of the roots, will have contrary ſigns in the two equations. For example, the product of four, viz. $abcd$, having the ſame ſign in both, and one equation in the fifth term having $abcd \times +e$, and the other $abcd \times -e$, it follows, that their product $abcde$ muſt have contrary ſigns in the two equations: Theſe two equations, therefore, that have the ſame roots, but with contrary ſigns,

have nothing different but the ſigns of the alternate terms, beginning with the ſecond. From which it follows, that if any equation is given, and you change the ſigns of the alternate terms, beginning with the ſecond, the new equation will have roots of the ſame value, but with contrary ſigns. See EQUATION.

It is often very uſeful to transform an equation into another that ſhall have its roots greater or leſs than the roots of the propoſed equation by ſome given difference.

Let the equation propoſed be the cubic $x^3 - px^2 + qx - r = 0$. And let it be required to transform it into another equation, whoſe roots ſhall be leſs than the roots of this equation by the given difference (e); that is, ſuppoſe $y = x - e$, and, conſequently, $x = y + e$; then, inſtead of x, and its powers, ſubſtitute $y + e$, and its powers, there will ariſe this new equation:

$$(A)\ \left.\begin{array}{r} y^3 + 3ey^2 + 3e^2y + e^3 \\ - py^2 - 2pey - pe^2 \\ + qy + qe \\ - r \end{array}\right\} = 0$$

whoſe roots are leſs than the roots of the preceding equation by the difference (e).

If it had been required to find an equation whoſe roots ſhould be greater than thoſe of the propoſed equation by the quantity (e), then we muſt have ſuppoſed $y = x + e$, and, conſequently, $x = y - e$, and then the other equation would have had this form:

$$(B)\ \left.\begin{array}{r} y^3 - 3ey^2 + 3e^2y - e^3 \\ - py^2 + 2pey - pe^2 \\ + qy - qe \\ - r \end{array}\right\} = 0$$

If the propoſed equation be in this form, $x^3 + px^2 + qx + r = 0$, then, by ſuppoſing $x + e = y$, there will ariſe an equation agreeing, in all reſpects, with the equation (A), but that the ſecond and fourth terms will have contrary ſigns.

And by ſuppoſing $x - e = y$, there will ariſe an equation agreeing with (B), in all reſpects; but that the ſecond and fourth terms will have contrary ſigns to what they have in (B).

The firſt of theſe ſuppoſitions gives this equation,

$$(C)\ \left.\begin{array}{r} y^3 - 3ey^2 + 3e^2y - e^3 \\ + py^2 - 2pey + pe^2 \\ + qy - qe \\ + r \end{array}\right\} = 0$$

The ſecond ſuppoſition gives the equation,

$$(D)\ \left.\begin{array}{r} y^3 + 3ey^2 + 3e^2y + e^3 \\ + py^2 + 2epy + pe^2 \\ + qy + qe \\ + r \end{array}\right\} = 0$$

The firſt uſe of this transformation of equations is to ſhew how the ſecond (or other intermediate) term may be taken away out of an equation.

It is plain, that in the equation (A), whoſe ſecond term is $3e - p \times y^2$, if you ſuppoſe $e = \frac{1}{3}p$, and conſequently, $3e - p = 0$, then the ſecond term will vaniſh.

In the equation (C), whoſe ſecond term is $-3e + p \times y^2$, ſuppoſing $e = \frac{1}{3}p$, the ſecond term alſo vaniſhes.

Now the equation (A) was deduced from $x^3 - px^2 + qx - r = 0$, by ſuppoſing $y = x - e$: and the equation (C) was deduced from $x^3 + px^2 + qx + r = 0$, by ſuppoſing $y = x + e$. From which this rule may eaſily be deduced for exterminating the ſecond term out of any cubic equation.

Rule. Add to the unknown quantity of the given equation the third part of the coefficient of the ſecond term, with its proper ſign, *viz.* $\mp \frac{1}{3}p$, and ſuppoſe this aggregate equal to a new unknown quantity (y). From this value of y, find a value of x by tranſpoſition, and ſubſtitute this value of x, and its powers, in the given equation, and there will ariſe a new equation that ſhall want the ſecond term.

Example. Let it be required to exterminate the ſecond term out of this equation, $x^3 - 9x^2 + 26x - 34 = 0$, ſuppoſe $x - 3 = y$, or $y + 3 = x$; and ſubſtituting according to the rule, you will find

$$\left.\begin{array}{r} y^3 + 9y^2 + 27y + 27 \\ - 9y^2 - 54y - 81 \\ + 26y + 78 \\ - 34 \end{array}\right\} = 0$$

$$y^{3*} \quad - \quad y - 10 \quad = 0$$

In which there is no term where y is of two dimenſions, and an aſteriſk is placed in the room of the ſecond term, to ſhew it is wanting.

Let the equation propoſed be of any number of dimenſions repreſented by (n); and let the coefficient of the ſecond term, with its ſign prefixed, be $-p$; then ſuppoſing $x - \frac{p}{n} = y$, and, conſequently, $x = y + \frac{p}{n}$, and, ſubſtituting this va-

lue

lue for x in the given equation, there will arise a new equation that shall want the second term.

It is plain, that the sum of the roots of the proposed equation is $+p$; and since we suppose $y = x - \frac{p}{n}$, it follows, that in the new equation, each value of y will be less than the respective value of x by $\frac{p}{n}$; and since the number of the roots is n, it follows, that the sum of the values of y will be less than $+p$, the sum of the values of x, by $n \times \frac{p}{n}$, the difference of any two roots; that is, by $+p$: therefore, the sum of the values of y will be $+p-p=0$.

But the coefficient of the second term of the equation of y is the sum of the values of y, viz. $+p-p$, and, therefore, that coefficient is equal to nothing; and, consequently, in the equation of y, the second term vanishes. It follows then, that the second term may be exterminated out of any given equation by the following

Rule. Divide the coefficient of the second term of the proposed equation by the number of dimensions of the equation; and assuming a new unknown quantity y, add to it the quotient, having its sign changed. Then suppose this aggregate equal to x, the unknown quantity in the proposed equation; and for x, and its powers, substitute the aggregate and its powers, so shall the new equation, that arises, want its second term.

If the proposed equation is a quadratic, as $x^2 - px + q = 0$, then, according to the rule, suppose $y + \frac{1}{2}p = x$, and, substituting this value for x, you will find

$$\left.\begin{array}{r} y^2 + py + \frac{1}{4}p^2 \\ -py - \frac{1}{2}p^2 \\ + \quad q \end{array}\right\} = 0$$

$$y^2 \quad * - \tfrac{1}{4}p^2 + q = 0$$

And, from this example, the use of exterminating the second term appears: for, commonly, the solution of the equation, that wants the second term, is more easy. And, if you can find the value of y from this new equation, it is easy to find the value of x by means of the equation $y + \frac{1}{2}p = x$. For example, Since $y^2 + q - \frac{1}{4}p^2 = 0$, it follows, that $y^2 = \frac{1}{4}p^2 - q$, and $y = \pm\sqrt{\frac{1}{4}p^2 - q}$, so that $x = y + \frac{1}{2}p = \frac{1}{2}p \pm \sqrt{\frac{1}{4}p^2 - q}$.

If the proposed equation is a biquadratic, as $x^4 - px^3 + qx^2 - rx + s = 0$, then by supposing $x - \frac{1}{4}p = y$, or $x = y + \frac{1}{4}p$, an equation shall arise having no second term. And if the proposed is of five dimensions, then you must suppose $x = y \pm \frac{1}{5}p$. And so on.

When the second term in any equation is wanting, it follows, that the equation has both affirmative and negative roots, and that the sum of the affirmative roots is equal to the sum of the negative roots: by which means, the coefficient of the second term, which is the sum of all the roots of both sorts, vanishes, and makes the second term vanish.

In general, the coefficient of the second term is the difference between the sum of the affirmative roots and the sum of the negative roots: and the operations we have given serve only to diminish all the roots, when the sum of the affirmative is greatest, or increase the roots when the sum of the negative is greatest, so as to balance them, and reduce them to an equality.

It is obvious, that, in a quadratic equation that wants a second term, there must be one root affirmative, and one negative; and these must be equal to one another.

In a cubic equation that wants the second term, there must be either two affirmative roots equal, taken together, to a third root that must be negative; or, two negative equal to a third that must be positive.

Let an equation $x^3 - px^2 + qx - r = 0$ be proposed, and let it be now required to exterminate the third term.

By supposing $y = x - e$, the coefficient of the third term in the equation of y is found (see equation A) to be $3e^2 - 2pe + q$. Suppose that coefficient equal to nothing, and by resolving the quadratic equation $3e^2 - 2pe + q = 0$, you will find the value of e, which, substituted for it in the equation $y = x - e$, will shew how to transform the proposed equation into one that shall want the third term.

The quadratic $3e^2 - 2pe + q = 0$ gives $e = \frac{p \pm \sqrt{p^2 - 3q}}{3}$.

So that the proposed cubic will be transformed into an equation wanting the 3d term, by supposing $y = x - \frac{p - \sqrt{p^2 - 3q}}{3}$, or $y = x - \frac{p + \sqrt{p^2 - 3q}}{3}$.

If

If the propoſed equation is of n dimenſions, the value of e, by which the third term may be taken away, is had by reſolving the quadratic equation $e^2 + \frac{2p}{n} \times e + \frac{2q}{n \times n-1} = 0$, ſuppoſing $-p$ and $+q$ to be the coefficients of the ſecond and third terms of the propoſed equation.

The fourth term of any equation may be taken away by ſolving a cubic equation, which is the coefficient of the fourth term in the equation when transformed. The fifth term may be taken away by ſolving a biquadratic; and, after the ſame manner, the other terms can be exterminated, if there are any.

TRICHESTRUM, in natural hiſtory, the name of a genus of foſſils, of the claſs of the ſelenitæ, but differing extremely in figure and ſtructure from the common kinds. See the article SELENITÆ.

The ſelenitæ of this genus are compoſed of filaments ſcarce any where viſibly arranged into plates or ſcales, but diſpoſed in form of a radiated ſtar, made of a number of diſjunct ſtriæ.

TRIEDROSTYLA, in natural hiſtory, the name of a genus of ſpars, in form of trigonal columns, adhering by one end to ſome ſolid body, and terminated at the other by a trigonal pyramid. See SPAR. Of this genus there are four known ſpecies. 1. A ſlender one, with a long, obtuſe pyramid: this is one of the moſt common of all the ſpars, and is found in almoſt all parts of the world, ſometimes in ſingle and large ſpecimens, but more frequently in large congeries, coating over the fiſſures of ſtone, in form of cruſts. 2. One with ſhort, but pointed pyramids, common on Mendip-hills, and found in ſome other parts of England. 3. A thick one, with a longer pyramid, found in Northamptonſhire, and ſome other parts of the kingdom, encruſting the fiſſures of ſtone. And, 4. One with a very ſhort column, and a long, obtuſe pyramid: this is frequent in the mines of Germany, and not leſs ſo in thoſe of England, particularly in Derbyſhire.

TRIEXAHÆDRIA, in natural hiſtory, the name of a genus of perfect and pellucid, cryſtalliform ſpars, conſiſting of thrice ſix planes, being compoſed of an hexangular column, terminated at each end by an hexangular pyramid. Of this genus there are three known ſpecies. 1. A clear one, with narrow and oblong pyramids: this is found in the mountains of Germany and in North-Wales; but with us it is ſmall and coarſe. 2. One with ſhort pyramids, and a long column: this is found in the mines at Goſſelaer, in Saxony. And, 3. One with ſhort pyramids, and a thick and ſhort column, found with us in the lead-mines of Yorkſhire. See the article SPAR.

TRIPENTAHÆDRIA, in natural hiſtory, the name of a genus of ſpars, compoſed of thrice five planes, being made of a pentangular column, terminated at each end by a pentangular pyramid. Of this genus we have only one ſpecies: this has a moderately long column, and very ſhort and broad pyramids; it is found in Derbyſhire, Yorkſhire, and Cornwall, and is frequent about Goſſelaer, in Saxony.

TROT, in the manege, one of the natural paces of a horſe performed with two legs in the air, and two on the ground at the ſame time croſs-wiſe, like St. Andrew's croſs, and continuing ſo alternately to raiſe the hind-leg of the one ſide, and the fore-leg of the other ſide at once, leaving the other hind and fore-leg upon the ground, till the former come down. In this motion, the nearer the horſe takes his limbs from the ground, the opener, the evener, and ſhorter his trot will be. If he takes up his feet ſlovenly, it is a ſign of ſtumbling and lameneſs; if he treads narrow or croſs, it betokens interfering or failing; if he tread long, it ſhews over-reaching; if he ſteps uneven, it beſpeaks toil and wearineſs.

TUBULARIA FOSSILIS, in natural hiſtory, the name of a ſpecies of coral found very often foſſile in Germany and Italy, and compoſed of a great number of tubes, or longitudinal pipes, often reſembling ſo many worms ranged perpendicularly in the maſs. They are uſually found either in maſſes of a lax-ſtone, or in ſingle tubules in thoſe of the harder and firmer texture. In theſe two ſtates, this foſſil makes two very different appearances; and, according to the different directions in the maſs, or the different views of them that the ſections of it place them in, they make a number of very elegant figures.

TURCICA TERRA, TURKY-EARTH, in the materia medica, a very fine bole or medicinal earth, dug in great plenty in the neighbourhood of Adrianople, and uſed

uſed by the Turks as a ſudorific and aſtringent; and famous among them in peſtilential diſeaſes. It is ſometimes brought over to us alſo made up into flattiſh, orbicular maſſes of two or three drams-weight, and ſealed with ſome turkiſh characters. This earth is of a ſomewhat lax and friable texture, yet conſiderably heavy, of a greyiſh, red colour, but always redder on the ſurface than within; extremely ſoft, and naturally of a ſmooth ſurface: it melts freely in the mouth, with a conſiderably ſtrong, aſtringent taſte. See the article BOLES.

TURKY. (*Dict.*) TURKY-EARTH. See the article TURCICA TERRA.

TURNING. (*Dict.*) TURNING-EVIL, in cattle, a diſeaſe that cauſes them frequently to turn round in the ſame place. It is alſo called the ſturdy. The common remedy, recommended by Mr. Markham, is to throw the beaſt down, and bind him; then to open his ſkull, and take out a little bladder, filled with water and blood, which uſually lies near the membrance of the brain, and then gradually heal the wound.

TUSCAN-EARTH, in the materia medica, a yellowiſh, white, pure bole, conſiderably heavy, of a very ſmooth ſurface, not eaſily breaking between the fingers, but adhering ſlightly to the tongue, and melting very readily in the mouth. It is dug in many parts of Italy, particularly about Florence, where there is a ſtratum of it eight or ten feet thick, at the depth of five or ſix from the ſurface. It is given as a ſudorific, and eſteemed a great medicine in fevers, attended with diarrhœas. See BOLES.

V.

VALET. (*Dict.*) VALET, in the manege, a ſtick armed at one end with a blunted point of iron, to prick and aid a leaping horſe.

VALVE, (*Dict.*) in anatomy. The upper and, as it were, the lid of the iſthmus, between the teſtes and the firſt vermicular proceſs of the cerebellum, is called the valvula magna, or the great valve of the brain. Its uſe is to prevent the lymph from falling on the nerves, at the baſe of the cranium. See the article BRAIN.

The colon has a thick valve to prevent the excrements from paſſing into the ilion, and ſeveral other valves to retard the deſcent of the excrements. See the articles COLON and EXCREMENTS.

For the valve of the pyloris, ſee the article STOMACH.

For the ſemilunar valves, ſee the article SEMILUNAR.

For that remarkable valve in a fœtus, called by Cheſelden the valvula nobilis, ſee the article FOETUS.

For the connivent valves, ſee the article CONNIVENT.

VANELLUS, the LAPWING, in ornithology, the black-breaſted tringa, with a hanging creſt. See the article TRINGA. This ſpecies is about the ſize of the common pigeon; the head is ſmall, but very beautiful, a little depreſſed on the crown, but not at all on the ſides; the eyes are bright and piercing; the head is elegantly variegated, and is ornamented with a beautiful creſt hanging over the hinder part of the neck.

VARIATION. (*Dict.*) VARIATION *of the variation*, is the change in the declination of the needle, obſerved at different times in the ſame place.

VARIATION *of quantities*, in algebra. See the article COMBINATION.

VARIATION *of curvature*, in geometry, is uſed for that inequality or change, which happens in the curvature of all curves, except the circle; and this variation or inequality conſtitutes the quality of the curvature of any line. See the article CURVE.

Sir Iſaac Newton makes the index of the inequality or variation of curvature to be the ratio of the fluxion of the radius of curvature to the fluxion of the curve; and Mr. Mac Laurin, to avoid the perplexity that different notions, connected with the ſame terms, occaſion to learners, has adapted the ſame definition; but he ſuggeſts, that this ratio gives rather the variation of the ray of curvature, and that it might have been proper to have meaſured the variation of curvature, rather by the ratio of the fluxion of curvature itſelf to the fluxion of the curve; ſo that

that the curvature being inverſely as the radius of the curvature, and conſequently its fluxion as the fluxion of the radius itſelf directly, and the ſquare of the radius inverſely, its variation would have been directly, as the meaſure of it, according to Sir Iſaac's definition, and inverſely, as the ſquare of the radius of curvature.

VARIATION, in muſic, is underſtood of the different manners of playing or ſinging a tune or ſong, whether by ſubdividing the notes into ſeveral others of leſſer value, or by adding graces, *&c.* in ſuch manner, however, as that one may ſtill diſcern the ground of the tune through all the enrichments; which are called embroideries.

VARICIFORMES PARASTATÆ, in anatomy, a name which ſome authors give to two veſſels near the bladder, by reaſon of their many turnings, ſerving to work and prepare the the ſeed the better. See PARASTATÆ and DEFERENTIA VASA.

VARICOSUM CORPUS, in anatomy, the ſame as corpus pyramidale. See the article PYRAMIDALIA CORPORA.

VEGETABLE. (*Dict.*) Vegetables, according to the analyſes made of them by chemiſtry, are diſtinguiſhable into two grand tribes, the acid and the alkaline; the firſt affording a volatile acid, and the ſecond a volatile alkali, upon a dry diſtillation: thus guaiacum, cedar, box, cinnamon, cloves, ſorrel, mint, balm, *&c.* afford an acid; but garlic, leeks, onions, horſe-radiſh, ſcurvy-graſs, muſtard, *&c.* afford an alkali, which, when rectified, is hardly diſtinguiſhable from that of animal ſubſtances, ſo as nearly to reſemble the ſpirit and ſalt of hartſhorn.

VELARIUS, in antiquity, an officer in the court of the Roman emperors, being a kind of uſher, whoſe poſt was behind the curtain in the prince's apartments; as that of the chancellors was at the entry of the baluſtrade, and that of the oſtiarii at the door. The velarii had a ſuperior of the ſame denomination who commanded them.

VELITES, in the Roman army, a kind of antient ſoldiery, who were armed lightly with a javelin, a caſk, cuiraſſe and ſhield.

VELLEITY, *velleitas*, in the ſchool-philoſophy, is uſually defined a languid, cold, and remiſs will. Others ſay, it implies an impotency of obtaining what we require. Others will have it a ſlight deſire for ſomething which a perſon does not matter much, or is too indolent to ſeek. See the article WILL, *&c.*

VELOCITY. (*Dict.*) In the doctrine of fluxions it is uſual to conſider the velocity with which magnitudes flow, or are generated. Thus, the velority with which a line flows, is the ſame as that of the point, which is ſuppoſed to deſcribe or generate the line. The velocity with which a ſurface flows, is the ſame as the velocity of a given right line, that, by moving parallel to itſelf, is ſuppoſed to generate a rectangle, always equal to the ſurface. The velocity with which a ſolid flows, may be meaſured by the velocity of a given plain ſurface that, by moving parallel to itſelf, is ſuppoſed to generate an erect priſm, or cylinder, always equal to the ſolid. The velocity with which an angle flows, is meaſured by the velocity of a point, ſuppoſed to deſcribe the arc of a given circle, which ſubtends the angle, and meaſures it. All theſe velocities are meaſured at any term of the time of the motion, by the ſpaces which would be deſcribed in a given time, by theſe points, lines, or ſurfaces, with their motions continued uniformly from that term.

The velocity with which a quantity flows, at any term of the time, while it is ſuppoſed to be generated, is called its fluxion. See the artile FLUXION.

VENETA *bolus*, the *Venetian bole*, a fine red earth uſed in painting, and called in the colour-ſhops venetian red. It is improperly denominated a bole, being a genuine ſpecies of red ochre. It is of a fine bright, and not very deep red, approaching, in ſome degree, to the colour of minium, or red-lead, and is moderately heavy, and of an even and ſmooth texture, yet very friable, and of a duſty ſurface: it adheres firmly to the tongue, is very ſmooth, and ſoft to the touch, eaſily crumbles to pieces between the fingers, and very much ſtains the ſkin in handling. It has a ſlight aſtringent taſte, and makes no fermentation with acids. It is dug in Carinthia, and ſent from Venice to all parts of the world, being an excellent colour, and very cheap; our colour-men however find many ways of adulterating it.

VENIAL, in the Romiſh theology, a term applied to ſlight ſins, and ſuch as eaſily obtain pardon. In confeſſing to the prieſts, people are not obliged to accuſe themſelves of all their venial ſins. The thing that gives the greateſt embarras to the Romiſh caſuiſts, is to diſtinguiſh be-

tween

tween venial and mortal ſins. The reformed reject this diſtinction of venial and mortal ſins, and maintain, that all ſins, how grievous ſoever are venial, and all ſins, how ſlight ſoever, are mortal. And the reaſon they urge is, that all ſins, though of their own nature mortal, yet become venial or pardonable, by virtue of our Saviour's paſſion, to all ſuch as fulfil the conditions on which it is offered in the goſpel. To which the romaniſts anſwer, that the chief of theſe conditions is confeſſion. See CONFESSION and ABSOLUTION.

VICTIMARIUS, in antiquity, a miniſter or ſervant of the prieſt, whoſe office was to bind the victims, and prepare the water, knife, and other things neceſſary for the ſacrifice. See SACRIFICE.

To the victimarii it alſo belonged to knock down and kill the victims, in order to which they ſtood cloſe by the altar naked to the waiſt, but crowned with laurel; and holding a hatchet or a knife up, aſked the prieſt leave to ſtrike; ſaying, *agone?* whence they were called agones and cultellarii. See AGON.

When the victim was killed, they opened it, and after viewing the entrails, took them away, waſhed the carcaſe, ſprinkled the flour on it, *&c.* The ſame victimarii lighted the fire wherein books were condemned to be burnt.

VISCERA. (*Dict.*) *Wounds of the* VISCERA. If any of the viſcera ſituated in the abdomen, as the liver, ſpleen, or kidney, has received a wound from a ſharp inſtrument, at the firſt dreſſing the wound muſt be filled as tenderly as poſſible with lint well ſaturated with highly rectified ſpirit of wine, or ſpirit of turpentine, ſecuring the dreſſings with compreſſes and a bandage; by this means the hæmorrhage will be ſtopped, if no large veſſel is divided. When this part is gained, the wound muſt be treated in the common manner, and the patient kept very low; bleeding him, if of a plethoric habit, and giving daily two or three doſes of Locatellus's balſam; for balſams of this kind are of great ſervice in healing internal wounds. This is the method to be taken with wounds of the viſcera, which may be diſcovered by the eye or touch. But in ſuch of them as are hidden, and not to be thus diſcovered, all that can be done is to inject vulnerary decoctions, and keep a paſſage open for the evacuation of ſordes, or grumous blood. See WOUND, *&c.*

VISIER, or VIZIER, an officer or dignitary in the ottoman empire, whereof there are two kinds; the firſt, called by the Turks viſier-azem, that is, grand viſier, is the prime miniſter of ſtate of the whole empire. He commands the army in chief, and preſides in the divan or great council. Next to him are ſix other ſubordinate viſiers, called viſiers of the bench, who officiate as his counſellors, or aſſeſſors in the divan.

VIVIPAROUS. (*Dict.*) The females of all the quadruped claſs are viviparous, and thoſe of the bird-claſs are all oviparous. The laws of nature in the larger animals, are therefore, in a great meaſure, fixed and certain; but it is not ſo in the inſect tribes, nor in the fiſhes; for of theſe ſome are viviparous, and others oviparous; and thoſe of genera nearly allied to one another. Among inſects, the much greater number are oviparous; but there are many which are not ſo, as the pucerons, progallinſects, cochineal, &c. The millepedes and ſcorpions are alſo well known to be ſo; all the females of the butterfly, and of ſome other claſſes, lay only eggs: but the moſt ſingular and remarkable inconſtancy in nature, if we may be allowed the expreſſion, is that in the fly-kingdom; the ſame claſs of inſects, and even the ſame genus, will furniſh us with ſome which are viviparous, and others which are oviparous; the two-winged flies give us inſtances of this; but theſe are not ſingle in that reſpect; for among the reptile world, there are other creatures which are ſubject to the ſame varieties; and Swammerdam has obſerved a viviparous ſnail. The two-winged viviparous flies bring forth worms, in all reſpects the ſame with thoſe hatched from their eggs in the other ſpecies.

UNICORNU FOSSILE, *Foſſil unicorn's horn*, the name of a ſubſtance much uſed in medicine in ſome parts of the world, and, which ſeems to have been very little underſtood by many who have written of it; but is now determined to be no other than a terrene, cruſtaceous ſpar, not very different from the oſteocolla and other bodies of that genus called the cibdeloplacium. See OSTEOCOLLA and CIBDELOPLACIA.

It is eſteemed as a ſudorific and aſtringent, and is given in fevers attended with diarrhœas, with great ſucceſs.

UNITY. (*Dict.*) It is to be obſerved in algebra, that unity itſelf has three dif-

ferent expreſſions of its cube-root, one real, and the other two impoſſible or imaginary. Thus the three cube-roots of 1, are 1, $\frac{-1+\sqrt{-3}}{2}$ and $\frac{-1-\sqrt{-3}}{2}$

This is ſometimes of uſe in finding the cube-roots of quantities, appearing under impoſſible expreſſions. The two impoſſible expreſſions, according to Mr. Mac Laurin, of $\sqrt[3]{}$ may be found thus: Let $x = 1$ then $x^3 = 1$ or $x^3 - 1 = 0$ and $x - 1 = 0$. Divide $x^3 - 1$ by $x - 1$, the quotient is $xx + x + 1 = 0$, or $xx + x = -1$; reſolve this quadratic equation, by adding $\frac{1}{4}$ to both ſides. Then $xx + x + \frac{1}{4} = -\frac{3}{4}$, and extracting the ſquare-root, $x + \frac{1}{2} = \sqrt{-\frac{3}{4}} = \frac{\sqrt{-3}}{2}$.

Therefore $x = -\frac{1}{2} \pm \sqrt{-\frac{3}{4}} = \frac{-1 \pm \sqrt{-3}}{2}$.

That is, $x = \frac{-1+\sqrt{-3}}{2}$ and $x = \frac{-1-\sqrt{-3}}{2}$.

UNIVALVE *Shells*, in natural hiſtory, a term uſed to expreſs one of the three general claſſes of ſhell fiſh; the other two being the bivalves and multivalves. See SHELL, BIVALVES, and MULTIVALVES. The univalve ſhells are thoſe which conſiſt only of one piece, not of two or more joined together. Of theſe univalve ſhells, nature affords a very great variety; ſo that they are aptly diſtributed by a late French author into fifteen diſtinct genera. Theſe are, 1. The patellæ, or limpets. 2. The patellæ planæ, called alſo auris marina, the ear-ſhell. 3. The canales, or tubuli marini, the ſea-tubes. 4. The lunar cochleæ, or round-mouthed ſnails. 5. The cochleæ ſemilunares, or ſnails with ſemicircular mouths. 6. The cochleæ ore depreſſo, or flat-mouthed ſnails. 7. The naviculæ or boat-ſhells, commonly called nautili or nautilus. 8. The buccina, or trumpet-ſhells. 9. The turbines. 10. The volutæ. 11. The rhombi. 12. The murices. 13. The purpuræ. 14. The conchæ globoſæ. And 15. The porcellanæ, each of which ſee under its proper head, PATELLA, AURIS *Marina*, *&c.* Hiſt. Nat. Eclairc. part II. p. 235.

VOLUNTEERS, in the military art, perſons who of their own accord, and at their own expence, ſerve in the army.

VOLVULA, in natural hiſtory, the name of an extraneous foſſil body, nearly allied to the entrochus, being compoſed of the ſame ſubſtance, and being like that of a cylindric column, made up of ſeveral joints; the commiſſures of the joints are, however, much leſs viſible in the volvulæ than in the entrochi, and they are not ſtriated, as in the entrochus, from the center to the circumference. See the article ENTROCHUS.

The volvulæ are of various figures; ſome reſemble in ſhape a little bottle, and are called volvulæ utriculatæ, and of theſe ſome have, and others have not, a ſtar marked on their bottom; others of them ſwell out in the middle, and taper a little toward each end; and theſe, from their reſemblance in ſhape to a little barrel, are called dolioli, or volvulæ doliatæ. There is great reaſon, from the analogy theſe bear to the entrochi, and other foſſils which owe their form to animal remains, to ſuppoſe theſe of the ſame origin; but we yet know not to what animal it is that they have belonged.

VOMITING. (*Dict.*) VOMITINGS *in Infants*. See the article INFANT.

VOMITING *of blood*, *vomitus cruentus*, a very dangerous kind of hæmorrhage, conſiſting in a bringing up by vomit of pure and unmixed blood from the ſtomach, and being a method, uſed by nature to throw off a portion of the blood, which moleſts the whole in the vena porta, and by that means to facilitate the circulation of the reſt of the maſs. See the article HÆMORRHAGE.

This diſtemper ſometimes ariſes from internal cauſes, and is regularly periodical, obſerving the ſtated times of the eruptions of the menſes, or other natural diſcharges; ſometimes it ariſes from accidents, ſuch as the giving of violent purging or emetic medicines, or corroſive ones. Among the preceding ſigns of this diſorder, are to be reckoned a ſenſation of ſtraitneſs and anxiety in the præcordia, with tenſion, and involuntary ſighs; with a naufea or ſickneſs of the ſtomach, and a ſtraining to vomit; which is more violent than in vomiting on any other occaſion; after this the blood is thrown up pure, and the vomiting then ceaſes, till, after a plain ſenſation of more blood being collected in the ſtomach, the efforts to diſcharge it in the ſame manner are again renewed. The quicker the blood is thrown up, after its being diſcharged into the ſtomach, the more fluid and more florid it appears; the longer it is detained there, the blacker and thicker it appears.

pears. A vomiting of blood is but an uncommon diſorder. It more frequently attacks women than men; among the female ſex it is principally ſeen in thoſe whom the menſes have left too early in life, or who have had violent ſuppreſſions of them for a long time. In men, this diſtemper ſeldom ſeizes any but thoſe who have been uſed to periodical diſcharges from the hæmorrhoidal veſſels, and who have had them ſuddenly ſtopped; and they are then uſually firſt attacked with violent pains in the left hypochondrium. People of ſcorbutic habits, and ſuch as have had quartan agues of long ſtanding, have been ſometimes thus affected. And, beſide theſe natural cauſes, people of all ages and ſexes may vomit blood, from external injuries.

A vomiting of blood is ever a dangerous diſorder; for though the quantity of blood thrown up is ſeldom ſo great as to occaſion immediate death, yet it generally degenerates into a tabes in men, and into a cachectic habit in women. It is leſs dangerous to young women, than to any other perſons; and when it is periodical, eſpecially when it obſerves the times of the menſtrual diſcharges, is much leſs dangerous than under any other circumſtances. During the paroxyſm, the proper medicines are powders of nitre, cinnabar, and the abſorbent ſubſtances, ſuch as crabs-eyes, or the like, and afterwards bleeding, cupping, and gentle purges; and diaphoretics are to be given for ſome time.

URINE. (*Diet.*) *Incontinence of* URINE. This is a term uſed by medical writers to expreſs an involuntary excretion of this liquor, whether it be inceſſantly, or in larger quantities at different intervals. This is of two kinds; in the one it is only in the night, in the time of ſleep; and this ariſes merely from careleſſneſs, and a bad habit: in the other, it depends on a paralytic affection of the ſphincter of the bladder; and in this caſe it drops away continually from the patient; and this is therefore called by ſome a ſtillicidium. Authors alſo divide an incontinence of urine into the idiopathic and ſymptomatic: the idiopathic is a diſeaſe in itſelf, and depends upon the preceding cauſes; the ſymptomatic happens to different perſons on different occaſions, as a ſymptom of other complaints. It is common to dying perſons; it is alſo very frequent to women who are big with child, and ſometimes happens from violent ſneezing, coughing, or laughing. The voiding of the urine involuntarily, and in the ſleep, in infants, is not to be accounted a diſeaſe; but when this cuſtom continues with them as they grow up, from idleneſs, or ill habit, it is at length to be conſidered as a diſeaſe, as they are by no means able to help it. Women who have ſuffered much in childbirth are often ſubject to an incontinence of urine afterwards, eſpecially perſons who have had their firſt child at an advanced age. People in years, who are ſubject to paralytic complaints, are alſo often afflicted with this troubleſome complaint; and many who have been cut for the ſtone by perſons not ſufficiently ſkilled in the operation. Perſons ſubject to the piles alſo ſometimes fall into it, from the ſuppreſſions of their uſual diſcharges, and ſometimes from the tumors becoming fiſtulous, and reaching to the neck of the bladder. Impoſthumes of the bladder will alſo occaſion it, and violent external injuries.

An incontinence of Urine, which happens only in the night, and is merely cauſed by a bad habit, and not of long ſtanding, uſually admits of a cure; but the ſtillicidiums of urine, from paralytic diſorders of the ſphincter of the bladder, are very rarely cured, eſpecially when they have been fixed ſome time upon the perſon. The involuntary voiding the urine in the night, in children, is to be cured, in a great meaſure, with puniſhment for the neglect, and by denying them much liquids after dinner-time; by a proper diet; the avoiding all diuretics, and the making water immediately before going to bed; and when it has gone ſo far, that the tone of the parts is injured, the uſual ſtrengthening medicines are to be given, as in the following caſes. When the incontinence of urine is occaſioned by a paralytic weakneſs of the ſphincter, nervous and ſtrengthening medicines are the proper method of curing; in this caſe, maſtic, amber, nutmeg, and cinnabar, are found to be of great ſervice, and pills or powders compounded of them, are an excellent general remedy to be given in ſmall doſes, two or three times a day. Externally, it is very proper to uſe by way of fomentation, decoctions of roſemary, ſage, ſerpyllum, marjoram, and the like warm herbs in red wine. When the diſeaſe is occaſioned by an impoſthume or ulcer in the neck of the bladder, balſamics are to be given,

as maſtic, gum-juniper, and boiled turpentine; but when it is owing to injuries received in child-birth, the manual operation of the ſurgeon is uſually to be preferred to all internal medicines.

UT. (*Dict.*) A latin term ſignifying literally *as*, much uſed in ſtating of ratios and proportions. See the article RATIO and PROPORTION.

Sir Iſaac Newton aſſigns its uſe thus: if indeterminate quantities of divers kinds be compared together, and one of them be ſaid to be *ut*, *as*, any other directly or inverſely, the meaning is, that the firſt is increaſed or diminiſhed in the ſame ratio as the latter: and if one of them be ſaid to be *ut*, *as*, two or more others directly, or inverſely, the meaning is, that the firſt is increaſed or diminiſhed in a ratio compounded of the ratios, in which the others are increaſed or diminiſhed. Thus, if A be ſaid to be *as*, B directly, and *as* C directly, and *as* D inverſely, the meaning is, it is increaſed or diminiſhed in the ſame ratio with $B \times C \times \frac{1}{D}$, that is, A and $\frac{BC}{D}$ are to each other in a given ratio.

VULGATE. (*Dict.*) VULGATE *of the New Teſtament*. This the romaniſts generally hold preferable to the common greek text, in regard it is this alone, and not the greek text, that the council of Trent had declared authentic. Accordingly that church has, as it were, adopted that edition. The prieſts read no other at the altar, the preachers quote no other in the pulpit, nor the divines in the ſchools.

UVULA. (*Dict.*) *Prolapſus* UVULÆ. See the article PROLAPSUS.

W.

WAGGON. (*Dict.*) WAGGON-*maſter general*, in the military art, is he who has the ordering and marching of the baggage of the army. On a day of march he meets the baggage at the place appointed in the orders, and marſhals it according to the rank of the brigade or regiment each waggon belongs to, which is ſometimes in one column, ſometimes in two; ſometimes after the artillery; and ſometimes the baggage of each column follows their reſpective column.

WATCH. (*Dict.*) A perſon poſted as a ſpy in any place, to have an eye thereto, and to give notice of what paſſes. A watch is properly intended for the apprehending of rogues in the night, as ward is for the like purpoſe in the day time; and for default to watch and ward, the townſhip, *&c.* is puniſhable. It is ordained, that in all towns between Michaelmas day and the day of Aſcenſion, there ſhall be night-watches kept in each city, with ſix men at every gate, and ſix or four in a town. Alſo every borough is to have twelve men to watch therein, or otherwiſe in proportion to the number of the inhabitants in the place, from ſun-ſet to ſun-riſing, who are to arreſt ſtrangers ſuſpected, and diſturbers of the peace, *&c.* and may juſtify the detaining of them till the morning; or they may deliver them to the conſtable, in order to be carried before a juſtice.

WATER. (*Dict.*) WATER-*Beetle*, *Dytiſcus*, in zoology. See DYTISCUS.

WATER-SCORPION, *nepa*, in zoology. See the article NEPA.

WEDNESDAY, the fourth day of the week, ſo called from a ſaxon idol named Woden, ſuppoſed to be Mars, worſhipped on this day.

Aſh-WEDNESDAY, the firſt day of Lent, ſo called from the cuſtom obſerved in the antient chriſtian church of penitents expreſſing their humiliation at this time, by appearing in ſack-cloth and aſhes. The want of this diſcipline is at preſent ſupplied, by reading publickly on aſh-wedneſday the curſes denounced in ſcripture againſt the ſeveral ſorts of ſins, the people repeating after each curſe, Amen.

WHEEZING, the name of a diſtemperature in horſes, accounted by the generality of people to be the ſame with that called purſiveneſs. See PURSIVENESS.

WHELP, the young of a dog, fox, lion, or any wild beaſt. Nothing is more eſſential to the having a good pack of hounds, than a proper care of the whelps, and of the parents from which they are to be

be bred. The bitches in particular ſhould be carefully choſen, and ſhould be ſuch as are ſtrong and well proportioned; they muſt alſo have large ribs and flanks. See the articles DOG and HOUND.

The whelps muſt have good freſh ſtraw to lie in, and it muſt be often changed; they are to be kept in a place where neither the rain nor ſunſhine can be troubleſome to them, and once a week it will be proper to anoint them all over with a little nut-oil, with ſome ſaffron infuſed in it. This will prevent the flies from annoying them ſo much as they otherwiſe would, and will kill worms of all kinds. When they are fifteen days old, it is the cuſtom to worm them, and a week after, one joint of their ſtern ſhould be twiſted off. As ſoon as they can ſee, they ſhould have milk given them to lap; and at two months old, they ſhould be weaned, keeping them wholly from the bitch. They muſt at this time be well kept, but not too high fed; and it is proper to put ſome cummin-ſeed into their food, to keep the wind out of their bellies.

WHELPS, in a ſhip, the ſea-man's term for thoſe brackets which are ſet up on the capſtan cloſe under the bars; they give the ſweep to it, and are ſo contrived that the cable winding about them may not ſurge ſo much as it might otherwiſe do, if the body of the capſtan were quite round and ſmooth.

WILDS, a term uſed by our farmers to expreſs that part of a plough by which the whole is drawn forwards. See PLOUGH.

WORM. (*Dict.*) EARTH-WORM, *lumbricus*, a genus of inſects of the claſs of the anarthra, of a rounded ſhape, and covered with a ſoft and tender ſkin, marked with annular ridges and furrows. This inſect, when full grown, is often ten inches in length, and more than a third of an inch in diameter; its colour is a duſky red, and its ſkin is formed into rings, but is ſmooth and ſoft to the touch.

Sea WORM, is the rough lumbricus, growing to a foot, or more in length, and to the thickneſs of a man's finger.

WRASSE, or OLD WIFE, in ichthyology, a ſpecies of labrus, with the roſtrum turning upward, and the tail circular at the end. See the article LABRUS.

This is a very beautiful fiſh; its uſual ſize is about ten inches in length, and conſiderably thick in proportion; the back-fin has twenty-ſix rays, fifteen of which are prickly; the pectoral fins have fourteen rays each; the ventral ones only ſix; the pinna ani has thirteen, and three of theſe are prickly; the tail is large, and is ſemicircular at the extremity.

X.

XERANTHEMUM. (*Dict.*) See plate CCCII. fig. 6.

XYRIS. (*Dict.*) See plate CCCII. fig. 3.

Y

YAWNING, *oſcitatio*, an involuntary opening of the mouth, occaſioned by a vapour or ventoſity endeavouring to eſcape, and generally witneſſing an irkſome wearineſs, or an inclination to ſleep. Yawning, according to Boerhaave, is performed by expanding at one and the ſame time all the muſcles capable of ſpontaneous motion; by greatly extending the lungs; by drawing in gradually and ſlowly a large quantity of air; and gradually and ſlowly breathing it out, after it has been retained for ſome time, and rarefied; and then reſtoring the muſcles to their natural ſtate. Hence the effect of yawning is to move, accelerate, and equally

equally diſtribute all the humours thro' all the veſſels of the body, and conſequently to qualify the muſcles and organs of ſenſation for their various functions. Sanctorius obſerves, that a great deal is inſenſibly diſcharged, when nature endeavours to get rid of the retained perſpirable matter, by yawning and ſtretching of the limbs. To theſe a perſon is moſt inclined juſt after ſleep, becauſe, a greater quantity going off by the pores of the ſkin, than at other times, whenſoever a perſon wakes, the increaſed contraction that then happens, cloſes a great deal of the perſpirable matter in the cutaneous paſſages, which will continually give ſuch irritations, as excite yawning and ſtretching; and ſuch motions, by ſhaking the membranes of the whole body, and ſhifting the contacts of their fibres, and the incloſed matter, by degrees throw it off. Hence we ſee the reaſon, why healthful, ſtrong people are moſt inclined to ſuch motions, becauſe they perſpire moſt in time of ſleep, and therefore have more of the perſpirable matter to lodge in the pores, and greater irritations thereunto.

Z.

ZIMENT-WATER, or COPPER-WATER, in natural hiſtory, the name by which ſome have called water found in places where there are copper-mines, and lightly impregnated with particles of that metal. See the articles COPPER and VITRIOL.

The moſt famous ſpring of this kind is about a mile diſtant from Newſol, in Hungary, in a great copper-mine, where the water is found at different depths, and is received into different baſons, for the purpoſe of ſeparating the copper from it. In ſome of theſe it is much more highly ſated with this metal than in others, and will make the ſuppoſed change of iron into that metal much ſooner. The moſt common pieces of iron uſed in the experiments, are horſe-ſhoes, nails, and the like; they are found very little altered in ſhape after the operation, except that their ſurfaces are more raiſed. The water which performs this wonderful operation appears greeniſh in the baſons where it ſtands; but if a glaſs of it be taken up, it looks clear as cryſtal; it has no ſmell, but has a very ſtrong vitriolic and aſtringent taſte, inſomuch, that the lips and tongue are bliſtered and ſcorched on taſting it. The miners uſe this water as a medicine; and whatever ſickneſs they are ſeized with, they firſt attempt its cure by large doſes of the water, which uſually both vomits and purges them briſkly; they alſo uſe it in diſorders of the eyes. The copper produced from theſe waters is valued by the people much beyond any other copper, as being more ductile, and running eaſier in the fire. And from the ſeveral experiments made upon the water, the true nature of it may be eaſily underſtood. It contains a large quantity of the vitriol of copper, which it probably owes to a ſolution of that metal, by means of the acid of the common pyrites and water. When this is known the effects are not difficult to be accounted for; there being no real change of one metal into another, but the true ſtate of the caſe being that the particles of one metal are diſſolved and carried away, and thoſe of another metal depoſited in their place; a water thus impregnated is a menſtruum capable of diſſolving iron, and in the ſolution of that metal becomes ſo weakened as to let go the copper it before contained in ſmall parcels.

ZONA, or ZONA IGNEA, the *ſhingles*, in medicine, a ſpecies of herpes. See the article HERPES.

THE END.