coarſer diet and more exerciſe, uſually fall into fatal lethargies. In perfect lethargies, in which the patients cannot be wakened at all, they uſually die between the fourth and the ſeventh day, unleſs an eruption of ſome matter from the noſe or ears happen; which is not unfrequently the caſe in perſons who fall into this diſeaſe, after violent blows on the head. The coma is much the ſame in its prognoſtics as the lethargy; but in this a cold ſweat uſually preſages immediately approaching death. It is much better that a phrenitis ſhould happen to perſons in a lethargy, than that a lethargy ſhould happen to thoſe in a phrenitis.

Method of cure. In a lethargy the ſenſes are to be rouſed, and the humors deduced from the head to the lower parts by ſtimulating glyſters, and acrid ſuppoſitories, by ligatures on the oppoſite parts, by frictions, bliſters, and ſinapiſms, or ſuch cataplaſms as bring on heat and redneſs of the parts, applied to the ſoles of the feet and the palms of the hands; as alſo by twitching off the hairs in very ſenſible parts, by applying volatile ſalts to the noſe, by pricking with a needle, and by loud calling: and in plethoric habits, immediately after the clyſter, a vein ſhould be opened, and after that leeches applied to the temples; and internally, powders of nitre and cinnabar, with the gentle alexipharmics, are to be given; and all ſorts of camphorated medicines are proper to be applied externally, after ſhaving the head. In many caſes, crudities in the primæ viæ have a great ſhare in bringing on theſe diſeaſes, and in ſuch vomits and briſk purges are very proper.

In a coma, whether it be of the ſomnolent, or wakeful kind, the fever, which is the primary diſeaſe, is firſt to be regarded; but with the antifebrific medicines, the nitrous and cinnabarine ſhould be joined, and the camphorated ones uſed externally.

Preſervatives againſt them. Every preſervative muſt tend to the taking off what may prove the cauſes of theſe diſorders. For this purpoſe, in old perſons of mucous habits, the matter muſt be by all poſſible means derived from the head, and carried off by ſome ſafe way. In this intention, briſk purges of jalap and colocynth, and for thoſe of very ſanguine habits, of black hellebore, are to be given every quarter of a year. To theſe ſhould be added the bitters, and ſulphureous medicines, with the gum reſins, in form of pills: theſe ſhould be taken regularly at the equinoxes; and a proper diet muſt be obſerved, namely, drier foods muſt be principally eaten, and the ſpices frequently uſed, and the patient adviſed not to eat too heartily. Roaſted meats, in general, are better than boiled; and wine ſhould be drank in moderation, and ſome of it impregnated with bitters. *Junker*'s Conſ. Med. p. 678.

SOPRANO, in the Italian muſic, ſignifies the treble.

SORA, in botany, the name given by the people of Guinea to a kind of ſhrub which they uſe in medicine, boiling it in water, and giving the decoction in caſes of pain of any kind.

The leaves of this ſhrub are of the ſize and ſhape of thoſe of ſena; they ſtand upon ſhort footſtalks, and are woolly underneath. Philoſ. Tranſ. N° 231.

SORBUS, the *ſervice-tree*, in botany, the name of a genus of trees, the characters of which are theſe. The flower and fruit reſemble thoſe of the cratægus, but differing, in that the leaves are winged as thoſe of the aſh.

The ſpecies of *ſorbus*, enumerated by Mr. Tournefort, are theſe. 1. The common *ſervice*. 2. The cultivated *ſervice* with a large red fruit of a turbinated form. 3. The cultivated *ſervice* with large turbinated pale-red fruit. 4. The cultivated *ſervice* with a reddiſh middle-ſized turbinated fruit. 5. The cultivated *ſervice* with a reddiſh middle-ſized oval fruit. 6. The cultivated *ſervice* with a ſmall reddiſh turbinated late-ripening fruit. 7. The cultivated *ſervice* with ſmall turbinated fruit. And 8. the wild *ſervice*, or *ſorbus aucuparia*. *Tourn.* Inſt. p. 633.

SORE, among ſportſmen, denotes a buck of the fourth year.

SOREL, in the language of ſportſmen, a buck of the third year. See the article BUCK.

SOREL, in botany. See SORREL.

SOREX, in zoology, the name of a ſpecies of wild or field-mouſe, called the *dormouſe*, or *ſleeper*. There are two kinds of this creature, a larger and a ſmaller.

The larger *dormouſe* is nearly of the ſize of the common rat. Its colour is a browniſh grey, like that of the common mouſe, but variegated with ſomewhat of a reddiſh caſt on the ſides, and on the head. The ears are large and ſmooth; the belly is white; and the inner part of the legs, and the lower part of the tail, eſpecially toward the extremity, are of the ſame colour. The noſtrils and the feet are red; the tail is all over hairy, and is terminated by a thick tuft of white fur. The eyes are large and prominent, and of a fine jetty ſhining black. The beard is partly white, and partly black. Round about the eyes, and round the ears, there is a fine blackneſs; the upper part of the tail is alſo black. The ſmell of this creature is the ſame with that of the mouſe, and its dung is of the ſame kind. It lives in caverns underground, and ſleeps all the winter, as ſome affirm. It feeds on vegetables, and is particularly fond of hazel-nuts, which it uſually hoards up, when ripe, for a ſcarcer ſeaſon. *Ray*'s Syn. Quad. p. 219.

The ſmaller kind is much more common than the larger one. This is of the ſize of the common mouſe, and in different countries varies much in colour. In Italy Mr. Ray obſerved it all over of a reddiſh tawney on the upper part, except the end of the tail, and all its under part white, the tail only excepted; the tail covered with long and thick-ſet hairs, and looking ſomewhat like a ſquirrel's. The eyes are very black and prominent. Thoſe which the ſame author obſerved in England were leſs of the reddiſh hue on the back, and were not white under the belly, but only on the throat; neither had they the white tip at the end of the tail. Poſſibly the Italian and Engliſh may be really diſtinct ſpecies. This creature feeds on nuts and other ſuch fruits. It retires into caves in winter, and ſleeps much, but not through the whole winter, as has been ſuppoſed, for it lays up its winter-proviſion in its hole in autumn, and feeds on it at that time. *Ray*'s Syn. Quad. p. 220.

The *ſorex*, according to the Linnæan ſyſtem, makes a diſtinct genus of animals; the diſtinguiſhing character of which, is, that its dentes inciſores, or cutting-teeth, are two in number, and are ſerrated, or notched on each ſide. *Linnæi* Syſt. Nat. p. 40.

SORGLUM, in the materia medica, the name of the grain of the *milium arundinaceum*, called *Indian millet*. *Dale*'s Pharm. p. 262.

SORNI, a name given by ſome of the chemical writers to iron. *Caſt.* Lex. Med.

SORRANCE (*Cycl.*)—SORRANCE-*water*, a name given by our farriers to a ſolution of vitriol and ſome other ingredients in vinegar, a medicine much eſteemed in many of the diſeaſes of horſes: it is prepared in the following manner.

Take Roman-vitriol and roach-alum of each an ounce and half, verdigreaſe an ounce, copperas two ounces; reduce all theſe to powder together, and put them into a two-quart bottle, into which pour a quart of the ſtrongeſt and beſt wine-vinegar; this is to be ſet in balneo mariæ. The ſhort way of doing which by the farrier, is this: he puts a wiſp of hay into the bottom of a kettle, and then tying ſome pieces of lead or iron about the neck of the bottle, to make it heavy enough to ſink in water, it is ſet upon the hay ſo, as to ſtand very upright; then three notches are cut lengthwiſe in the cork to give paſſage to ſome of the vapours when the bottle is heated, that it may not burſt. When every thing is thus prepared, ſo much cold water is to be put into the kettle, that the neck of the bottle may ſtand two or three inches above it; the kettle is then to be ſet over the fire, and the water is to be made to boil, and kept boiling about half an hour, the bottle being at times taken out, and thoroughly ſhaken. When the ſalts are thus thoroughly diſſolved in the vinegar, the whole is to be kept for uſe.

The method in which they uſe it is this. Take an earthen pan, which will hold about twelve quarts, let this be filled with urine that has been made by ſound, healthy, and young perſons; the ſtaler the urine is, the better it is for uſe, and it ought indeed always to ſtand, at leaſt, three weeks before it is uſed. It is proper for the farrier, therefore, always to keep a quantity of this ready, and when the *water* is to be uſed, half a pint of it is to be mixed with a quart of the urine, or if it be required ſtronger, more of the *water* is to be added: theſe are to be thoroughly mixed together, and the legs, or other affected part of the horſe, bathed with it with ſoft rags twice a day.

The virtues of this *water* are highly extolled; it is ſaid to cure the malanders in two, or three times dreſſing; it is alſo a ſovereign remedy for the mange, either dry or wet, and for the rat-tails, ſcratches, gourded, or ſwelled legs and heels; and it alſo cures horſes when the greaſe is fallen into their heels, as the farriers expreſs it. The farcy is alſo ſaid to be often cured by a long continuance in the uſe of it, purging the horſe two or three times, at different diſtances of time, during the time of his being under cure by the *water*. They alſo find it a good cleanſer and healer of foul ulcers, and that it prevents the breeding of proud-fleſh and worms in wounds, and drives away a flux of humours that were falling upon any part. They uſe it alſo in clefts and cracks of the heels, and in windgalls, eſpecially in the prevention of the laſt by its repellent qualities. The green *water* alone is an excellent remedy for fiſtulas, cankers, and the galled backs of horſes; diſpoſing ſuch *ſorrances*, as they are called, not to feſter, rot, and grow worſe, as all greaſy and oily medicines do, but cleanſing them, and laying the way to a very ſound and ſtanding cure.

SORREL, *acetoſa*, the name of a genus of plants, the characters of which are theſe. The flower is of the ſtamineous kind, being compoſed of a number of ſtamina ariſing from a ſix-leaved cup. The piſtil, which is ſurrounded by theſe, finally becomes a triangular ſeed, wrapt round in a cup: this is compoſed of three of the ſix leaves of the cup, the other three withering away.

The ſpecies of *ſorrel*, enumerated by Mr. Tournefort, are theſe. 1. The common meadow-*ſorrel*. 2. The white-

flowered meadow-*sorrel*. 3. The meadow-*sorrel* with curled leaves. 4. The great mountain-*sorrel*. 5. The Pyrenean *sorrel* with very long and narrow leaves. 6. The mountain-*sorrel* with a broad and roundiſh leaf, ſomewhat reſembling that of arum. 7. The mountain-*sorrel* with leaves like thoſe of the lemon-tree, and with branched twigs. 8. The mountain-*sorrel* with undulated leaves, and not branched twigs. 9. The dwarf mountain-*sorrel* with the fagopyrum leaf. 10. The mountain-*sorrel* with knotty points. 11. The tuberoſe-rooted *sorrel*. 12. The *sorrel* with pale green ariſarum leaves. 13. The mountain-*sorrel* with narrow arrow-headed leaves. 14. The marygold-leaved *sorrel*. 15. The atriplex-leaved ſhining *sorrel*. 16. The great Italian *sorrel* with round glomerated ſeeds. 17. The lanceolated field-*sorrel*. 18. The tall narrow-leaved lanceolated, or ſheep's *sorrel*. 19. The narrow-leaved creeping lanceolated *sorrel*. 20. The ſmall *sorrel* with leaves not lanceolated. 21. The Cretic *sorrel* with prickly ſeeds. 22. The ſmall Cretic *sorrel* with utriculated ſeeds. 23. The baſil-leaved *sorrel*. 24. The American *sorrel* with leaves ſtanding on very long foot-ſtalks. 25. The roundiſh-leaved tree-*sorrel*. 26. The round-leaved garden-*sorrel*. 27. The round-leaved Alpine *sorrel*. 28. The round-leaved creeping Yorkſhire *sorrel* with leaves ſinuated in the middle. 29. The creeping ſhielded-*sorrel*. 30. The little erect *sorrel* with multifid leaves. 31. The trifid-leaved Indian *sorrel*. *Tourn.* Inſt. p. 502.

Sorrel ſeeds are found to contain a vaſtly larger proportion of the active principles this plant abounds with, than either the leaves or the roots. They are eſteemed aſtringent, and good in diarrhœas, dyſenteries, and hæmorrhages.

We much neglect this plant, becauſe it is common; yet this plant alone has very often proved a remedy for the ſcurvy. Mr. Morin, of the Academy of Paris, who in the Hotel Dieu had many hundred ſcorbutic patients, cured the greater part of them only by *sorrel* boiled and eaten with eggs.

Wood-SORREL, *lujula*, in medicine, is a very grateful acid; in fevers it quenches thirſt, and takes off the heat of the ſtomach. It is recommended in fevers of all kinds, and the ſcurvy; alſo in obſtructions of the liver and of the viſcera. It is ſometimes given in decoction in fevers, and the expreſſed juice is mixed with the juices of the other antiſcorbutic plants againſt the ſcurvy.

Externally, it is extolled againſt inflammatory eruptions of all kinds in decoction, which is to be uſed by way of fomentation. There uſed to be a ſyrup, but, at preſent, only a conſerve of this plant is retained in the ſhops.

SORREL, in the manege, is uſed for a reddiſh colour. The mane ought to be red, or white, in a horſe of this colour. It is diſtinguiſhed, according to the degrees of its deepneſs, into a *burnt sorrel*, and a *bright*, or *light sorrel*. Generally ſpeaking, it is a ſign of a good horſe.

SORY, in natural hiſtory, the name of a foſſile ſubſtance, much ſpoken of by the antients, but ſuppoſed to be now loſt: this, however, proves to be an error, for it is plentifully produced in the eaſtern parts of the world, and is in common uſe there, only under another name; neither indeed is it peculiar to that part of the world, though the inaccuracy of the late writers of foſſils has made them overlook or miſtake it.

It is a firm and not brittle ſubſtance, though of a ſpungy and cavernous ſtructure, and is conſiderably heavy. It is found in maſſes of no regular ſhape or ſize, ſome being roundiſh, others angular or flatted, and ſome of the ſize of a wallnut, others of many pounds weight. It feels very harſh and rough to the touch, and is covered with no inveſtient coat or cruſt, but ſhews its natural ſurface, which is always corrugated or wrinkled, and uſually full of ſmall protuberances and cavities, and when broken, is found to be of a rugged and ſpungy ſtructure within.

Its natural colour is a ruſty black, but it is ſometimes reddiſh, and ſometimes bluiſh; and is commonly ſtained, in different places, with ſpots of a bluiſh or ruſt colour, when black; and of a greeniſh hue, when it is of a reddiſh colour: in the places where it is free from theſe, it is uſually ſomewhat bright and ſparkling. It is of an acrid and diſagreeable taſte, and of a ſtrong and nauſeous ſmell: put into the fire it burns to a deep purple, and if boiled in water a great part of it becomes diſſolved in it; and this may again be ſeparated from the water by evaporation and cryſtallization, and then appears in the form of pure blue vitriol, forming regular rhomboidal cryſtals, and tinging iron to a copper colour, on being firſt wetted, and then rubbed upon it. *Hill*'s Hiſt. of Foſſ. p. 606.

It is found in many parts of the Turkiſh dominions, particularly in Gallo-Græcia; as alſo in ſome parts of Germany. In this country it is boiled for the blue vitriol it contains. In Turky it is mixed with lime, and made into a paſte with water, which is laid on ſuch parts of the body as they would eradicate the hair from, and effects that purpoſe in a very few minutes. In the eaſtern nations, where it is thus uſed, it is known by the name *ruſma*.

The antients uſed it externally to take off pimples, and put a piece of it into a hollow tooth, as a remedy for the tooth-ach. There can be no doubt of their *sory* being the ſame ſubſtance with this; ſince Dioſcorides has deſcribed it to be blackiſh in colour, full of ſmall cavities, moiſt on the ſurface (as ours always is in moiſt weather) and of a diſagreeable taſte and ſmell.

This ſubſtance, as alſo the chalcitis, miſy, and melanteria, are all properly ores of vitriol, the particles of thoſe ſalts being ſo perfectly blended in them, as not to be at all diſtinguiſhable to the naked eye, yet being always regularly ſeparable from them by water, which is to the ſaline ores what fire is to thoſe of the metalline kind. *Hill*'s Hiſt. of Foſſ. p. 607.

SOSPIRO, in the Italian muſic, a pauſe or reſt, equal to the time of a crotchet. See the articles PAUSE, REST, CHARACTER, *Cycl.*

Canone al SOSPIRO. See CANONE *al ſoſpiro*.

SOSTENUTO, in the Italian muſic, denotes that the ſound is to be held out in an equal and ſteady manner for the whole time of the note. Thus they ſay *arcate ſoſtenute*. See *Corelli*, Concerto 8.

SOTIRELLA, a name given by ſome to a compound medicine, in form of a hard maſs, and conſiſting of opium and ſome other narcotics, with camphor, wood-ſoot, and nutmeg. It is deſcribed in the Auguſtan Diſpenſatory, and is intended to be put into hollow teeth, as a remedy for the tooth-ach.

SOUGH, otherwiſe called an *addit*, in mineralogy, is a paſſage like a vault cut out under the earth, to drain the water from the mines. *Houghton*'s Compl. Miner in the Explan. of the Terms.

SOUL (*Cycl.*)—SOUL-*ſcot*, a certain fee paid by our Saxon anceſtors to the prieſt on opening a grave. See the article BURIAL.

SOUL-*trees*, in mining. See the article STOWS.

SOUND (*Cycl.*)—Mr. Euler [b] is of opinion, that no *ſound* making fewer vibrations than 30, or more than 7520 in a ſecond, is diſtinguiſhable by the human ear. According to this doctrine, the limits of our hearing, as to acute and grave, is an interval of eight octaves.—[b Tentam. Nov. Theor. Muſ. cap. 1. ſect. 13.]

SOUND, in the manege. A horſe is ſaid to be *ſound* that does not halt. When a jockey ſells a horſe, he warrants him *ſound* hot and cold; that is, that he does not halt either when you mount him, or when he is heated, nor yet after alighting, when he ſtands and cools.

SOUNDING (*Cycl.*)—SOUNDING *the pump*, at ſea, is done by letting fall a ſmall line, with ſome weight at the end, down into the pump, to know what depth of water there is in it.

SOUR *land*, in agriculture, a term uſed by the farmers to expreſs a cold and ſomewhat wet clayey ſoil.

This muſt have its tilth according to its ſtate and condition, when they ſet about it. If it have a ſtrong ſwarth upon it, then they give it a fallow, by turning it up when the ſun is in Cancer: this they call a ſcalding fallow, and eſteem it of great uſe, becauſe it kills the graſs roots, and makes the land fine; but if it be light, and have but a thin ſwarth, they leave it for a cooler tillage, and plow it early in the year, when their clay is fallowed.

Pigeon's dung and malt-duſt are the moſt proper manures for this ſoil. The malt-duſt is to be ſown with the winter-corn, and plowed in with it, for then it lies warm at the roots of the corn all winter. *Plot*'s Oxfordſhire, p. 246.

SOURDON, in zoology, the name of a bivalve ſhell-fiſh found on the coaſt of Poitou, and other places. It is a ſmall fiſh, its length being little more than an inch, and its breadth about three quarters of an inch. Its ſhells are both conſiderably convex, the outer ſurface is deeply furrowed, but the inſide is perfectly ſmooth. The fiſh buries itſelf lightly in the ſand, and has a pipe of communication, which it raiſes to the ſurface; but as this creature never buries itſelf deep, the pipe is neceſſarily very ſhort; but they are cut into ſeveral ſegments at the extremity, and appear as if were fringed, and have ſeveral hairs growing from theſe ſegments. The *ſourdon* is capable of a progreſſive motion by means of a limb, ſomewhat reſembling that of the other chamæ; but more than any approaching to the nature of a leg, as it in ſome meaſure repreſents, in miniature, a human leg with a clumſy boot upon it: by means of this limb the creature can eaſily bury itſelf in the ſand, or riſe up out of it, or move horizontally on the ſurface, and that as well backwards as forwards, and that with more ſwiftneſs than could be well ſuppoſed. Mem. Acad. Par. 1710.

SOURIS, in the manege, is a cartilage in the noſtrils of a horſe, by means of which he ſnorts. See SNORT.

The cutting of this cartilage is called in French *eſſouriſſer*.

SOUTHERNWOOD, *abrotanum*, in botany, the name of a genus of plants, the characters of which are wholly the ſame with thoſe of wormwood, and the plants are only to be diſtinguiſhed by their very different general face and appearance.

The ſpecies of *ſouthernwood*, enumerated by Mr. Tournefort, are theſe. 1. The broad-leaved ſcentleſs *abrotanum*. 2. The great narrow-leaved male *abrotanum*. 3. The greateſt narrow-

narrow-leaved male *abrotanum*. 4. The leſſer narrow-leaved male *abrotanum*. 5. The field-*abrotanum* with white ſtalks. 6. The broader-leaved field-*abrotanum*. 7. The field-*abrotanum* with red ſtalks. 8. The hoary field-*abrotanum* with the carline ſmell. 9. The low *abrotanum* with very large yellow tufts of flowers. 10. The ſweet-ſcented flax-leaved *abrotanum*. 11. The Spaniſh *abrotanum* with pontic wormwood leaves. 12. The ſea Spaniſh *abrotanum* with thick ſhining and rigid leaves. 13. The lightly hoary male *abrotanum* of Surinam. And 14. the tall hoary *abrotanum* with very thick-ſet leaves. *Tourn.* Inſt. p. 458.

Southernwood is an attenuant, and recommended by ſome in ſuppreſſions of urine, a drachm of it in powder being the doſe. Its decoction is good for recovering the hair when fallen off; and its juice is ſaid to cleanſe and heal old ulcers. The leaves of this plant dried and powdered, or given in a ſtrong infuſion, are good in all obſtructions of the liver and ſpleen; they are alſo of conſiderable virtue as antihyſterics, and are given in nephritic caſes. The good women give the expreſſed juice, of the tender tops of the plant, as a remedy againſt worms, and that with ſucceſs. There are accounts of perſons being cured of jaundices ſolely by the ſame medicine. Matthiolus recommends the leaves dried, and taken in powder, as a remedy for the fluor albus.

Female SOUTHERNWOOD. See the article SANTOLINA.

SOUTHING, in navigation, the difference of latitude a ſhip makes in ſailing to the ſouthward.

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 ſandſtone 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, at laſt it will contain as much as will make a *ſow* of two thouſand weight. *Ray*'s Engliſh Words, p. 126.

Sow, in zoology. See the articles HOG and SUS.

Sow-*bread*. See the article CYCLAMEN.

Sow-*thiſtle*, in botany. See SONCHUS.

SOWING (*Cycl.*)—One very great article in *ſowing* to advantage, is to know exactly at what depth the ſeed may be planted, 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, or more, and others will not bear to be buried at more than half an inch. The way to come at an accurate knowledge of the depth, at which every ſeed will come up beſt from the *ſowing*, is by making gages in the following manner. Saw off twelve ſticks of about three inches diameter, bore a hole in the end of each ſtick, and drive into each a taper peg; let the peg in the firſt ſtick be half an inch long, the next an inch, and ſo on, every peg being half an inch longer than the other, till the laſt is ſix inches long: then in that ſort of ground, in which you intend to plant, make a row of twenty holes with the half-inch gage, put therein twenty good ſeeds, cover them up, and then ſtick the gage at the end of that row. Proceed in the ſame manner with the eleven other gages, making the holes in the ſame row all with the ſame gage, and ſticking it at the end of the row: when the ſeeds begin to appear, it will be eaſy to ſee at what depth they come up beſt, by obſerving the moſt flouriſhing row, and taking up the gage at the end, and ſeeing what is its length.

By this means we not only know what is the depth in that ſort of ground, at which this ſort of ſeed will come up beſt, but alſo we are able to judge of the nature of the ſeed; for by obſerving how many of the twenty ſeeds that were *ſown* come up, and how many fail, it is eaſy to calculate how much bad ſeed there is among any given quantity, and to allow properly for it in the *ſowing*, that the field may be neither overſtocked with plants, nor too bare of them. The farmer often ſuſtains great loſſes by *ſowing* bad ſeed, or by burying good ſeed, and both might be effectually prevented, by making theſe eaſy trials. One caution is to be obſerved in this, that it is not proper to *ſow* the ſeeds of all plants at the greateſt depths at which they will come up, becauſe in wheat, and ſome other grain, a moiſt ground will rot the roots at this depth, Experience alone, added to theſe rules, can perfectly inſtruct the farmer in the certain way of ſucceeding; the nature of the land, the manner how it is laid, either flat or in ridges, and the ſeaſon of planting, muſt all be conſidered.

The quantity of ſeed is to be different alſo, according to the manner of the *ſowing*. The proper quantity to be drilled into an acre, is much leſs than muſt be *ſown* in the common way; not becauſe the hoeing will not maintain as many plants as the other way, 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 evenly 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 higheſt may have much too little, or even none of it, and this inequality leſſens in effect the quantity of the ſeed, becauſe fifty ſeeds, in the room of one, will not produce ſo much as one will do; and where they are too thick, without being in theſe cluſters, they cannot well be nouriſhed, their roots not ſpreading to near their natural extent, for want of hoeing to open the earth, and give them way. In the common way of *ſowing*, ſome of the ſeeds are buried out of all hope of ever coming up again, and ſome others are left naked upon the ſurface, where they become the food of birds, and of vermin: as ſo many muſt, therefore, periſh in the common way of *ſowing*, and ſo few can be loſt in the way by drilling, there is plain reaſon why the ſeed, neceſſary to *ſow* any given quantity of ground, ſhould be much leſs for the drill-way, than for the other. The farmers, in general, know nothing of the proper depth at which they ſhould *ſow* their ſeed, nor of the difference in quantity that is to be obſerved in different circumſtances; they allow the ſame quantity to an acre of rough ground, as they do to an acre of fine, and forget that what is too little for one, may yet be too much for the other; it is all mere chance-work, and they put their confidence in good ground, and a large quantity of dung to cover their errors.

The farmers in Wiltſhire allow more corn for the *ſowing*, than in any other part of England; they uſe ſometimes eight buſhels of barley to an acre, ſo that if it produce four quarters for an acre, there is but four grains for one encreaſe. This is ſown on land plowed once, and double dunged, the ſeed only harrowed into the hard and ſtale ground, ſo that it is very probable that not ſo much as two buſhels out of the eight take place, or come to any thing. Sometimes, in a very dry ſeaſon, an acre ſcarce produces four buſhels at the harveſt.

Inſtead of all this uncertainty and loſs in the common way, in drilling all the ſeed lies juſt at the ſame depth, not one grain of it being placed deeper or ſhallower than the reſt. As none of the ſeeds, therefore, can be loſt by being buried, or by being expoſed on the ſurface to vermin, no allowance is to be made for theſe accidents; all that is to be allowed for in the *ſowing*, is the miſchief that may happen from the worm, the froſt, or the like unavoidable accidents, common to all ſeeds.

When a man has (by the uſe of the gages, and the growth of the ſeeds planted in the rows marked by them) proved the goodneſs of the ſeed, and found the depth it is to be planted at, he is to calculate what number of ſeeds a buſhel, or any other weight or meaſure, contains; for one buſhel, or one pound of ſmall ſeed, may contain double the number of ſeeds of a buſhel, or a pound of large ſeed of the ſame ſpecies. This calculation is made by weighing an ounce, and then calculating the number of ſeeds this ounce is compoſed of; then weighing a buſhel, and multiplying the number of ſeeds in an ounce by the number of ounces in the buſhel, and the product will give the number of ſeeds in the buſhel with ſufficient exactneſs. When this is known, the ſeeds are to be proportioned by the Rule of Three to the ſquare feet in an acre; or elſe it may be done, by dividing the ſeeds of the buſhel by the ſquare feet in an acre, and the quotient will give the number of ſeeds for every foot. Then the farmer is to conſider how near he intends to plant the rows, and whether ſingle, double, treble, or quadruple; for the more numerous the rows are, the more ſeed will be required. The narrow ſpaces between double, triple, or quadruple rows, ſuppoſe ſeven inches, the double having one, the treble two, and the quadruple three, are called *partitions*. The wide ſpace, ſuppoſe of five feet, between any two of theſe double, treble, or quadruple rows, is called an *interval*.

Examine next what is the produce of one middle ſized plant of the annual, but the produce of the beſt and largeſt of the perennial ſort, becauſe that, by hoeing, will be brought to its utmoſt perfection; proportion the ſeed of both to the reaſonable product, and when it is worth while adjuſt the plants to their competent number with the hand-hoe after they are up, and plant perennials generally in ſingle rows. Laſtly, plant ſome rows of the annual thicker than others, which will ſoon give experience, preferable to all the rules in the world, for the quantity of ſeed neceſſary for the drilling.

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. There is a method of planting the rows by the drill at very near diſtances, and in this work one horſe may draw a drill with eleven ſhares, making the rows at three inches and a half diſtance from each other, and at the ſame time *ſowing* in them three different ſorts of ſeeds, which do not mix, and theſe at different depths. Thus the barley-rows may

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be ſeven inches aſunder, and the barley four inches deep; a little more than three inches above that, in the ſame channels, clover-ſeed; and betwixt every two of theſe rows, a row of ſaint foin ſeed covered half an inch deep.

Mr. Tull, who tried this method, obtained the firſt year a very good crop of barley, the next year two crops of broad clover, where that was *ſown*; and where hop-clover was *ſown*, a mixture of that and of ſaint foin, and every year afterwards a crop of ſaint foin. But the ſame gentleman was afterwards ſo fully convinced of the folly of theſe, or any other mixed crops, and of *ſowing* with theſe narrow ſpaces, that he never practiſed it afterwards.

Every row of vegetables to be horſehoed, ought to have an empty ſpace, or interval, of thirty inches, on one ſide of it at leaſt, and of near five feet in all ſorts of corn: this will ſeem a monſtrous allowance to thoſe who have not experienced the good effects of it, but all who have will readily come into the practice of it ever afterwards. The line of corn is called one row, though it be double, triple, or quadruple, becauſe when four of theſe rows grow up in the ſpring, they unite, and ſeem to be all one row. Wide intervals are neceſſary for perfect horſehoeing, and the largeſt vegetables have generally the greateſt benefit by them, though ſmall plants may have conſiderable benefit from much narrower intervals than thoſe of five feet.

In handhoeing there is always leſs ſeed, fewer plants, and a greater crop, *cæteris paribus*, than in the common *ſowing*; yet there the rows muſt be much nearer than in horſehoeing, becauſe as the hand moves many times leſs earth than the horſe, the roots will be ſent out in a like ſmaller proportion; and if the ſpaces, or intervals, where the broad hoe only ſcratches a little of the ſurface, ſhould be wide, they would be ſo hard and ſtale underneath, that the roots of perennial plants would be a great while in running through them, and the roots of annual plants would not be able to do it at all. The advantage of the horſehoeing is principally owing to the depth to which it ſtirs the ground, and familiar inſtances have proved, that the ſtirring it to a like depth, by whatever inſtrument, is of the utmoſt advantage to whatever plants are ſet in the place. A poor fellow in Wiltſhire was obſerved to have always his cabbages much larger and finer than his neighbours, though his ground was no better, and he could afford leſs dung; but the reaſon was, that inſtead of clearing away the weeds between them with a handhoe, he uſed to dig between with a ſpade, which goes as deep as a horſehoe, and comes the neareſt anſwering its purpoſes of any inſtrument whatever. *Tull*'s Horſehoeing Huſbandry. See the article INTERVALS.

Man has found out many advantageous ways of propagating, whether by *ſowing* or planting ſuch trees and herbs as he beſt knows the uſes of, but nature as much excels him in this article as in all the reſt, when any compariſon can be made; and it appears evident to the naturaliſt, that ſhe has taken more care to propagate and *ſow* the moſt trivial weeds, as we eſteem them, than we can employ in regard to the choiceſt plant. It is owing to this care, that no one ſpecies of plant has ever been loſt, notwithſtanding all the accidents they are daily ſubject to.

There is not, perhaps, a more eminent inſtance of this care of nature, than in that plant, commonly known in America under the name of the *wild pine*, and called by botaniſts *viſcum caryophylloides*. This is a large plant with leaves like the pine-apple, and it grows on the boughs of other trees, as miſletoe does with us, but that its roots do not pierce into the ſubſtance of the wood, as is the caſe in this plant, but only ſpread themſelves upon the ſurface. The ſeeds of this plant are ſmall and light, and they have a very long and fine down adhering to them, by means of which, as ſoon as they are diſlodged from the capſules, they are taken up by the winds, and ſupported in the air till they ſtrike againſt ſome branch of a tree which is proper to give them a place of growth: here the downy fibres become of a ſecond uſe, in that they hold faſt the ſeed, and will not let it drop down, but it remains thus ſupported till the time of its ſtriking root, which it does from many points at once, and conſequently a number of roots are immediately propagated, in different directions, over the ſurface of the bark. Philoſ. Tranſact. N° 251. p. 116.

It is neceſſary, to the ſupport of this plant, that it ſhould always have a quantity of water within itſelf to ſupply its juices. This water is retained in the center of the leaves, which are hollow within, and form a ſort of bulb for this purpoſe; but as it cannot be preſerved, unleſs the plant ſtands erect, and as the ſeeds, in their various flight before the wind, are as often ſtruck againſt the lower, or ſide parts, as againſt the upper ſurface of a bough, ſo the plant generally begins to ſhoot in a wrong direction; but ſo provident is nature, that it immediately turns itſelf up, whether from the ſide, or from the very bottom of the branch. This reſervatory is not only of uſe to the plant, but ſerves alſo to the birds, and to ſeveral ſmall animals, who, in times of ſcarcity of water, go to it, and ſeldom fail of finding enough there: nay, Dampier tells us that himſelf and his ſailors, when on ſhore in ſome of the American iſlands, and in diſtreſs for water, have been often relieved by it; for that, on ſtriking in a knife a little above the root, the water always came out in large quantities, and they uſed to catch it in their hats, and drink as much as they had occaſion for.

The faſtening of the ſeeds of this plant to the branches of trees, on which they are to grow, is not a ſingle inſtance of the providence of nature in propagating vegetables: we ſee in the ſea fucuſes ſomething of a like kind. The proper place of growth of theſe is on rocks and ſtones, and accordingly, as the ſeeds of the viſcum are made light, that they may fly in the air, and aſcend to the places where they are to grow, ſo thoſe of the fucuſes are made heavy, that they may deſcend even in water, and fall upon the ſtones that are to give them ſupport. This peculiar gravity is given to the ſeeds of the ſea plants, by means of a glutinous jelly with which they are ſurrounded while in the capſule, and which falls out with them; and is not only of uſe in carrying them to the bottom, but alſo in faſtening them to the ſtones on which they alight, otherwiſe they would eaſily roll off again, and be toſſed about, and loſt among this immenſe bed of waters; but by means of this jelly they are firmly kept in their place, till they have made ſuch ſhoots as are ſufficient to ſupport them againſt the waſhing of the waves; then the jelly dries away, and leaves the water free acceſs to them, to nouriſh them.

The moſſes have been by former ages ſuppoſed to have no ſeeds at all; but it has of late been found that they have immenſe numbers, and thoſe of the only kind that could be of ſervice to their propagation; that is, ſuch as are extremely ſmall and light. It is neceſſary that the ſeeds of theſe minute plants ſhould often be carried upward, in order to their being placed on trees, walls, and other eminences: this is eaſily performed by the winds, when the ſeeds are ſo ſmall, that, on being diſlodged, they look like ſmoak, not like any ſolid ſubſtance; but it could not have been ſo well executed, had they been larger. The common cup-ſeeding muſhroom produces, on the contrary, large and ſolid ſeeds; theſe cannot grow in any ſeaſon but a very moiſt one, and nature providing for this, has ſo ordained it, that the cup remains cloſed, and the ſeeds firm in its bottom, in dry weather; but as ſoon as a ſhower of rain falls the cup opens, and the ſeeds are waſhed out and thrown upon the wet ground, where they immediately grow. Philoſ. Tranſ. N° 251. p. 118.

Many of thoſe plants, whoſe ſeeds ſtrike well from the ſurface, and do not require to be buried as others do, are furniſhed with a downy ſubſtance to every ſeed, which makes the whole ſo light, that it floats in the air, and is carried to great diſtances; by this means every ſeed is carried a vaſt diſtance its own way, and if one falls on an improper ſoil, another ſucceeds better. We have a very remarkable late inſtance of the ſpreading of plants, from this proceſs of nature, in the ſmall Canada fleabane with toad-flax leaves. This plant was, ſome years after the ſettlement of the French in America, brought into Europe, and firſt *ſown* in the gardens of France, and then in thoſe of England; out of both which its downy ſeeds were wafted by the winds into the fields, and there produced the plant, which thence became a wild inhabitant, both of France and England, and continues ſo to this day, thriving as well with us as in its native ſoil.

Other plants, which are deſtined to grow at ſome ſmall diſtances from one another, have been provided by nature with elaſtic, or ſpringy ſeed-veſſels, which throw their ſeeds to a diſtance, without the help of man. The yellow arſmart, and ſome of the cardamines, called for this reaſon *noli me tangere*, are of this kind, as alſo our wild wood-ſorrel, and many others. In all theſe plants, as ſoon as the ſeed is perfectly ripe, and fit for *ſowing*, the ſeed-veſſel burſts at the firſt rude ſhock of wind, and toſſes out its ſeeds to three feet diſtance in ſome caſes. This diſtance is alſo encreaſed by the action of the wind, which burſts the capſule, and the ſeparated ſeeds are often carried thus to five, ſix, or ſeven feet diſtance from the mother plant, and ſcattered different ways, ſome falling by the way, and the reſt ſpreading abroad as they go along.

There is one remarkable inſtance of the care of nature of one plant in this way, which is the *ſpirit weed* of Jamaica. The ſeeds of this plant can only grow in a wet ſeaſon; and in conſequence of this it is ſo provided, that the pods containing them can only open in wet weather; they will remain ever ſo long whole upon the plant in a dry time, but as the firſt ſhower falls, the ſeed-veſſels being wetted, burſt open, and ſcatter their ſeeds ſeveral ways, and every one immediately ſtrikes root and grows.

The lychniſes, poppies, and ſnapdragons, all have their ſeed-veſſels open at the top only, and in theſe the ſeeds lie ſecurely till a windy ſeaſon happens, then they are diſlodged; and do not fall all together, as they otherwiſe would, in one ſpot, raiſing a cluſter of young plants to ſtarve and ſpoil one another; but they are, according to the ſame great intent of nature, ſcattered to ſuch diſtances, that every one may produce

a plant in such circumstances as it may thrive under. Philos. Trans. N°251. p. 120.

SPA (*Cycl.*)—Spa-*water*. The contents of this *water*, by means of which it is able to do such great things in many chronical cases, are understood by the following experiments and observations.

1. When the *Spa-water* is carried to any distant place, though ever so well stopped down, they always, after a time, will precipitate a small quantity of a yellow ochreous earth.

2. If a single grain of galls be put into an ounce of *Spa-water*, it tinges the whole with a beautiful purple; but if the *water* be heated before the galls are put in, there will not be the least change of colour produced in it.

3. Mixed with milk they do not coagulate it, but when mixed with wine they make a great ebullition, and throw up a large quantity of air-bubbles with a peculiarly pleasing smell.

4. The *waters* drank at the spring cause a sort of drunkenness, but it does not last above a quarter of an hour.

5. A small vial being filled up to a certain height with *Spa-water*, and afterwards exactly to the same height with pure distilled water, and weighed, when filled with each, in a nice balance, was found, when the *Spa-water* was in it, to weigh three ounces, four drachms, and forty grains, and with the other, three ounces, four drachms, and forty one grains; so that the *Spa-water*, notwithstanding its mineral particles, is somewhat lighter than the purest common water.

6. And finally, a pint of the *Spa-water* evaporated over a very gentle fire, leaves behind only a grain and half of a white powder.

Hence it appears, that the *Spa-waters* are the lightest and most subtle of all the mineral waters; and the small quantity of earth, and large portion of subtle mineral spirit they contain, bespeak their possessing the most exalted virtues of all the 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 the proper emunctories.

SPADE, (*Cycl.*) is an instrument for digging up the ground; the handle, or shaft, is about three feet long; the head of it 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 a foot, or fifteen inches, and the breadth six or eight.

SPADO, among the Romans, differed from an eunuch only in this, that the latter was deprived both of the penis and testes, but the *spado* of the testes only. *Hofm.* Lex. univ. in voc. See Eunuch, *Cycl.*

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.

SPAGNUOLA, in the Italian music, denotes a guitar.

SPANIEL. This sort of dog is of great use, but subject to many distempers; among these the mange is a very frequent one, and is the most pernicious of all others to his quiet and his beauty, and is very apt, when one dog has it, to spread to others that come in its way. The best cure is a decoction of a large quantity of brimstone, with some common salt and wood-ashes, in water and urine, of each equal quantities; this is to be used three or four times a day, washing the creature well with it before the fire, or in the warm sun. If this is not strong enough, the same ingredients, with the addition of a considerable quantity of wood-soot, are to be boiled in strong vinegar, and the liquor used in the same manner; but this must never be used in cold weather, as it would then endanger the creature's life.

When this disease is not in a violent degree, it may be cured by the herb agrimony internally taken. The method is to pound the roots, leaves, and seeds of this plant in a mortar, and mix them with a large quantity of wheaten-bran; they are to be then made into dough in the common way, and baked in an oven; the dog is to have no other bread but this for some time, but he is to eat of this as often, and as much as he will: this, without any farther care, has cured many.

Another very troublesome disorder in this creature, is what is called the *formica:* this infests only the ears, and is caused by flies, and by the dog's scratching for them. The best medicine for the cure of these is this: take a quantity of pure and clean gum tragacanth, infuse it in white-wine vinegar; let as much vinegar be used as will serve to soften it, and when it has lain a week in it, let it be taken out and ground on a marble, as the painters grind their colours, adding to it roach-alum and galls, reduced to powder, of each two ounces; all this is to be well mixed together, and the matter, if it grows too stiff in the grinding, is to be moistened with some of the vinegar in which the gum was soaked: when all is thoroughly mixed, and ground fine, it is to be put by in a gallypot, and a small quantity of it applied to the creature's ear every night till the complaint is removed.

The swelling of the throat is another disease very common to *spaniels*, but the cure of this is easy, there needs only to bath it well with oil of camomile, and afterwards wash it with a mixture of vinegar and salt; this done night and morning will, in a few days, wholly remove the complaint. *Spaniels* will sometimes, when they have much rest and good food, lose their sense of smelling, but this is recovered by a brisk purge and repeated airings; a very common dose, on this occasion, is a drachm of jalap, and two drachms of sal gem, mixed up into a bolus with oxymel of squills: this is to be rubbed over with some butter, and will be got down in that manner pretty easily, and will work briskly.

SPAR, (*Cycl.*) in natural history. *Spars* are defined to be 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.

Of this class of bodies there are ten orders, and under those twenty one genera, many of which, from their accidental admixtures, deviate greatly in appearance from the natural state of pure *spar*.

Of the first order are the pellucid crystalliform and perfect *spars*, composed of a column terminated at each end by a pyramid.

Of the second are those composed of two pyramids joined base to base, without any intermediate column.

Of the third are the crystalliform columnar *spars*, adhering by one end to some solid body, and terminated at the other by a pyramid.

Of the fourth are the pyramidal crystalliform *spars* without columns.

Of the fifth are the *spars* of a parallellopiped form.

Of the sixth are the *spars* externally of no regular form, but breaking into rhomboidal masses.

Of the seventh order are 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.

The eighth order comprehends 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.

Of the ninth order are the *spars* formed into oblong cylindric bodies, known by the name of *stalactitæ*, or stony icicles.

And the tenth comprehends those 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. These are, 1. the *cubic*, owing their figure to lead. 2. The *pyramidal* with four planes, owing their figure to tin. 3. The *rhomboidal*, consisting of six planes, owing their figure to iron. *Hill*'s Hist. of Fossils, p. 201.

The genera of these several orders are these.

Of the first there are three. 1. The *triexahedria*, those which are composed of a hexangular column, terminated at each end by a hexangular pyramid. 2. The *tripentahedria*, those composed of a pentangular column, terminated at each end by a pentangular pyramid. And 3. the *enneahedria*, which are composed of a trigonal column, terminated at each end by a trigonal pyramid.

Of the second order there are three genera. 1. The *dioctahedria*, *spars* composed of two octangular pyramids joined base to base. 2. The *diexahedria*, composed of two hexangular pyramids joined base to base. And 3. the *ditrihedria*, which are composed of two trigonal pyramids joined base to base.

Of the third order there are also three genera. 1. The *hexaedrostyla*, which are hexangular columns, terminated by hexangular pyramids. 2. The *pentaedrostyla*, composed of a pentangular column, terminated by a pentangular pyramid. And 3. the *triedrostyla*, composed of a trigonal column, terminated by a trigonal pyramid.

Of the fourth order there are only two genera. 1. The *hexapyramides*, *spars* in form of hexangular pyramids without columns. And 2. *tripyramides*, those in form of trigonal pyramids without columns.

Of the fifth order there is only one known genus, the *parallellopipedia*, *spars* of a regular parallellopiped figure, as well in their whole masses, as in their constituent particles.

Of the sixth order there is also only one known genus, the *anomorhomboidia*, *spars* of no regular external figures, but breaking into rhomboidal masses.

Of the seventh order there are two known genera. 1. The *placagnodiaugia*, semipellucid, and of a striated texture within, and

and of cruſtaceous external figures. And 2. the *placagnoſcuria*, opake cruſtaceous *ſpars* of an irregular ſtructure within.

Of the eighth order there are two genera. 1. The *cibdeloſtracia*, terrene *ſpars*, found in form of thin plates on the ſurfaces of fiſſures in ſtone quarries. And 2. *cibdeloplacia*, terrene *ſpars*, uſually found coating over vegetable, or other extraneous matter in ſprings, *&c.*

Of the ninth order there are two genera. 1. The *ſtalactagnia*, cryſtalline *ſparry* ſtalactitæ. And 2. *ſtalacto-cibdela*, cryſtallino-terrene, *ſparry* ſtalactitæ.

And of the tenth order there are alſo two genera. 1. The *ſtalagmodiaugia*, or pellucid *ſparry* ſtalagmitæ. 2. *Stalagmoſcieria*, dull and opake *ſparry* ſtalagmitæ. *Hill*'s Hiſt. of Foſſils, p. 203.

The obſervation that *ſpar* is continually formed at this time in caves and grottos under ground, has given birth to many different conjectures as to the origin of that ſubſtance. We have accounts from Swiſſerland, and other places, that the ſnow by long lying on the earth, and being ſubject to repeated freezing, is at length hardened into *ſpar*: this is much of the nature of that opinion of the antients concerning cryſtal, that it was water frozen by ſevere colds to a ſort of ice, much harder than the common kind; both are equally erroneous and abſurd. But more rational conjectures, as to its origin, are, that it is produced either by effluvia alone, or by the joint force of effluvia iſſuing up from the depths of the earth, and mixing with water ouzing out of rocks into their cracks and cavities, or by the ſame water or effluvia paſſing through beds of this *ſparry* matter contained in clay. In the firſt place we are to obſerve, that *ſpar* is capable of being diſſolved either by water or vapour, and ſuſpended imperceptibly in either; and that though it remains ſuſpended a long time, yet there are occaſions of its ſeparating itſelf from either of theſe vehicles, ſuch are long ſtanding ſtill, and evaporation. What is called the growth and formation of *ſpar*, therefore, is properly perhaps only the change of place in this ſubſtance, and all that theſe agents, water and vapours, do, is only to waſh it out of the ſtrata of earth or ſtone, in which it lay in ſcattered particles, and bring it together into the cracks and crevices of ſtones, where it may again ſeparate itſelf, and become more pure and perfect. The operation of nature, in this caſe, is very like that of art in the extracting of ſalts from the various bodies they are mixed with; and *ſpar* in its two ſtates, when blended in the ſtrata of ſtone, *&c.* and when pure, and in form of cryſtals in the cracks, may be compared to alum, for inſtance, in its bed, and when purified. The alum in the common ſtones, from which it is made, is not perceptible to the eye, but lies in ſcattered particles; water being added to this takes up the ſalt, and when it has been managed by evaporation and reſt, yields it again purified and alone, and it forms ſuch cryſtals on the ſides of the veſſel as the other does on the ſides of the fiſſures of ſtone, which are the veſſels where the water, out of which it was formed, was ſet to evaporate, and to reſt a proper time. That ſome *ſpars* grow from vapours alone, is evident from the *ſtalactitæ*, or ſtony icicles, hanging down from the roofs of our caverns, which, though they grow downwards, yet have many times little plants of the ſame ſubſtance growing out at their ſides, and ſtanding upwards, contrary to the growth of the other, and evidently formed of the matter ſeparated from the vapours in their aſcent, as the ſtalactitæ themſelves are from ſuch as have aſcended to the roof, and there been condenſed into water, and ſent down again in drops. Nor is the *ſparry* matter alone thus raiſed in vapour, for even the metals, and other bodies, as little likely as thoſe to be thus raiſed, yet are found to form ſtalactitæ. The mundics in general, though they never form regular ſtalactitæ, yet often are found adhering to the ſides of them, and the metals, particularly iron and lead, form regular ſtalactitæ; the iron ones very common, and very perfect; the lead leſs perfect, and more rare; and Dr. Brown gives us abundant inſtances, of *ſpars* growing entirely from vapours in the baths of Buda in Hungary. Phil. Tranſ. N° 129.

Mr. Beaumont [b] is of opinion, that earth by degrees will ripen into *ſpar*; but this is an error. He founds his opinion on certain ſtalactitæ, and ſtalagmitæ, found in caverns, partly earth and partly *ſpar*, and ſuppoſes, that the whole would in time become *ſpar*; but there is nothing in nature to warrant this conjecture.—[b Phil. Tranſ. ibid.]

Mr. de Juſſieu has given us, in the Memoirs of the Paris Academy, a very remarkable account of the recryſtallization, or reproduction of the parts of *ſpar*, after ſolution, in the following inſtance.

There are found in the mines near St. Bell, where they dig copper-ore, a ſort of ſtones, which uſually cover the vein of the ore; theſe are compoſed of ſeveral flat plates laid evenly on one another, as our rhomboidal and parallellopiped *ſpars*, and theſe, as the diſtinctions of foſſils were not at that time eſtabliſhed, the author called, from their eaſy calcination, a ſort of gypſum, which he diſtinguiſhed from the reſt by their plated ſtructure. They are white on their outſide, and greyiſh within; and their internal part being heavy, and full of ſparkling points, they were ſuppoſed to contain ſome copper, and were thrown into the furnace uſed for roaſting the other ſtones in which copper was lodged. The calcination reduced theſe ſtones into a ſort of plaſter, or gypſum: After this theſe calcined ſtones, which were now as red as colcothar of vitriol, were thrown into tubs, and large quantities of water were poured on them; this took up their cupreous, their vitriolic, and their *ſparry* particles. From theſe tubs the impregnated liquor was let out into a baſon, in the midſt of which were placed ſeveral pieces of iron; theſe were all immediately changed in appearance into copper by the liquor. The liquor ſent up all this while a thick white vapour, which covered all its ſurface, and aroſe to the height of a foot above the edge of the baſon. This vapour by degrees diſſipated itſelf into air; but where it had touched, not only the ſides of the baſon that were above the ſurface of the liquor, but alſo the earth about the edges, were covered with ſmall regular cryſtals, of a figure approaching to a parallellopiped, and of an inſipid taſte, in ſome degree tranſparent, and very thin and flat in proportion to their breadth or length. Theſe were the ſingle cryſtals, but the continual formation of them, one upon another, at length formed of them concrete maſſes, reſembling large cakes of tartar. Theſe were like the other a true *ſpar*, being indiſſoluble in water, and eaſily calcining in the fire, and having all the other qualities of the ſtones from which they were originally obtained. This proceſs is the more ſingular, as calcination is a very ſtrange method of procuring the cryſtals of a body, and in this ſubſtance ſeems entirely to deſtroy them in their original ſtate; ſo that chance alone could have diſcovered a property of their riſing in vapour from this, and again aſſuming their proper form; but it would deſerve a trial whether the common *ſpars*, which will recryſtallize after ſolution in the acid menſtrua, will alſo do it after calcination. Mem. Acad. Par. 1719.

SPARS, in medicine, have from the earlieſt times been recommended in nephritic complaints. 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. See CRYSTAL.

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. See the articles BELEMNITES and OSTRACITES.

SPARAGUS, or ASPARAGUS, *ſperage*, in botany. See the articles ASPARAGUS and SPERAGE.

SPARGANOSIS, a word uſed by ſome to expreſs a milk-tumor in women's breaſts.

SPARGUS, in ichthyology, a name given by Gaza to the common ſparus, which he calls alſo *fluta*.

Artedi calls it the plain yellow *ſparus* with an annular ſpot near the tail. See SPARUS.

SPARLING-*fowl*, in zoology, a name given in ſome places by the country people to the female merganſer, called more uſually the *dundiver*. This ſo much differs from the male of the ſame ſpecies, as to have deceived the generality of authors into thinking it a different bird.

SPARRING, or SPARING, among cock-fighters, a term uſed to ſignify the fighting of a cock with another to breathe him; in which fights they put hotts on their ſpurs, that they may not hurt one another. Sportſm. Dict. in voc. See the article HOTTS.

SPARROW, in zoology. See the article PASSER.

SPARROW-*graſs*, in botany, *&c.* See ASPARAGUS.

SPARSE-*leaves*, *ſparſa folia*, among botaniſts. See LEAF.

SPARTIUM, in botany, the name of a genus of plants, the characters of which are theſe. The flower is of the papilionaceous kind; the piſtil, which ariſes from the cup, finally becomes a ſhort roundiſh turgid pod, which uſually contains a kidney-ſhaped ſeed.

The ſpecies of *ſpartium*, enumerated by Mr. Tournefort, are theſe. 1. The yellow-flowered *ſpartium* with a kidney-ſhaped ſeed. 2. The white-flowered Spaniſh *ſpartium*. 3. The prickly ebony-like purſelain-leaved American *ſpartium*. And 4. the climbing citron-leaved American *ſpartium* with white flowers growing in cluſters at the joints. *Tourn.* Inſt. p. 645.

SPARTOPOLIAS *lapis*, in natural hiſtory, a name given by ſome authors to a whitiſh agate, variegated with long and ſlender ſtreaks of grey diſpoſed in a variouſly undulated order, and reſembling grey hairs.

SPARUS, in the Linnæan ſyſtem of zoology, the name of a genus of fiſhes of the general order of the acanthopterygii, the characters of which are, that the opercula of the gills are ſcaly, and the mouth is furniſhed with grinders covered with lips. Of this genus are the ſargus, cantharus, melanurus, *&c.* *Linnæi* Syſt. Nat. p. 54.

In the Artedian ſyſtem of ichthyology, the characters of this genus of fiſhes are theſe. The coverings of the gills are ſcaly. The teeth are covered with lips, as in quadrupeds.

The teeth in the jaws reſemble the dentes canini of men. The molares, or grinders, are like thoſe of quadrupeds. The teeth are placed only in the jaws and fauces, their palate and tongue being ſmooth. There is but one back fin. The eyes are covered with a lax ſkin, and the tail in moſt of the ſpecies is forked. The inteſtines are long, and they are twiſted in ſpiral forms, and often fixed to the meſentery. The appendices to the pylorus are large, and few in number, from three to ſeven being the uſual numbers.

Of the *ſpari* ſome have acute and cylindric teeth; of theſe the following are the ſpecies of them. 1. The *ſparus* with a very acute back, and an arched yellow ſpire between the eyes. This is the *aurata*, or gilt-head. 2. The ſilver-eyed *ſparus* with yellow parallel longitudinal lines on each ſide. 3. The red *ſparus* with ſilver eyes. This is the *rubellio* of authors. 4. The reddiſh *ſparus* with the ſkin formed into a ſinus at the root of the back fin and the pinna ani. This is called the *brama marina*, or ſea-bream. The tail is forked, and the mouth has granulous tubercles in it. 5. The variegated *ſparus* with an acute back, and with four large teeth. This is the *dentex* and *ſynodon* of authors. 6. The *ſparus* with four longitudinal parallel lines, of a golden and ſilvery colour. This is the *boops* of authors. 7. The variegated *ſparus* with a black ſpot in the middle of each ſide, and with four large teeth. This is the *mana* of authors. 8. The *ſparus* with a black ſpot on each ſide, and with the pectoral fins and the tail red. 9. The *ſparus* with the upper jaw longeſt, and with two tranſverſe black lines on each ſide. 10. The *ſparus* with the ſecond bone of the belly fins extended into a long hair. This is the *chromis* of authors. 11. The variegated *ſparus* with an equal tail, and a black ſpot in it near the end. This is the *orphus* of authors. Its head is reddiſh. 12. The yellowiſh *ſparus* with a ſingle annular ſpot in the tail. This is the *ſparus* of authors, Artedi only having uſed the name in this extenſive generical ſenſe. 13. The *ſparus* variegated with yellow tranſverſe lines, with a large and remarkable ſpot at the tail. This is the *ſargus* of authors. 14. The *ſparus* variegated with longitudinal lines, with a black ſpot on each ſide of the tail. This is the *melanurus* of authors. 15. The *ſparus* with eleven lines on each ſide, which are gold coloured, and run longitudinally and parallel to one another. This is the *ſalpa* of authors. Thus have the ſeveral fiſhes, which are only ſo many ſpecies of the ſame natural genus, been treated of under almoſt as many generical names, to the great confuſion of thoſe who apply to this ſtudy. *Artedi*, Gen. Piſc. p. 28.

The *ſparus* is common in the Adriatic, and ſome other ſeas, and eſteemed a very delicate fiſh. *Aldrovand.* de Piſc. lib. 2. cap. 18. *Geſner*, Paralip. p. 1056.

The name *ſparus* is of Greek origin, being derived from the verb σπαιρειν, to palpitate, or tremble; and was given to this fiſh from its remarkable quality of trembling or palpitating all over the body, as ſoon as taken out of the water.

SPARUS, among the Romans, a kind of ruſtic weapon, bent backwards like the foot. It was likewiſe uſed for a ſmall dart, or miſſive weapon. *Pitiſc.* in voc.

SPASM (*Cycl.*)—A *ſpaſm* may be either univerſal, extending itſelf over the whole body, which is a very rare caſe; or partial, occupying only ſome one part of the body: theſe are very frequent, and ſeize at times on every part, from the head to the foot.

Of the nature of the univerſal *ſpaſms* are, 1. the *tetanus*, which ſeizes upon the whole body, and makes it ſtiff and rigid in every part. 2. The *emproſthotonos*, which bends the body forwards, ſo that the head is brought to meet the knees. 3. The *opiſthotonos*; this enclines the whole body forcibly backwards. And 4. the *catalepſis*, which ſeizes the whole ſyſtem in a moment, and fixes it rigidly and unalterably in that poſture in which it finds it; ſo that the poſition of every limb, and the very turn of the countenance, and look of the eyes, is the ſame as when the patient was ſeized. This is a very rare caſe.

To the claſs of particular and partial *ſpaſms* belong 1. many of the arthritic complaints. 2. The *incubus*, or nightmare, which is a *ſpaſm* of the breaſt. 3. The *convulſive aſthma*. 4. The *cynic ſpaſm*, which is a peculiar diſtortion of the face, reſembling that of a perſon while laughing. This endures uſually many hours, and is often of very fatal conſequence, frequently terminating in an apoplexy, or in the moſt terrible convulſions. 5. The *ſardonic laugh*, which only differs from the former in that it is attended with an abſolute delirium, which is not the caſe in the other. 6. The *priapiſm*, which is an involuntary and painful erection of the penis. 7. The ſpaſtic contraction of the colon in flatulent colics. 8. The *fixt ſpaſms* of Paracelſus, which the author deſcribes as often afflicting podagric and arthritic patients. *Junker*'s Conſp. Med. p. 608.

Spaſms in general, beſide theſe diſtinctions, are divided by authors into the ſudden, or inſtantaneous, which ſeize upon any muſcle in a moment, and keep it for a conſiderable time in a painful ſtate of contraction, and the ſlow ones.

The *ſlow ſpaſms* are alſo divided into two kinds. 1. The *muſcular* and *tendinous*. And 2. the *fibrillary*. In the firſt of theſe the whole muſcle is affected with tenſive pains, and the limb becomes finally contracted. In the other, the ſeparate fibres in the muſcle are only affected. This is uſually the caſe in *ſpaſms* in arthritic caſes, which ſeize a few fibres only at firſt, but finally faſten upon more, and extend themſelves over the whole muſcle, in which caſe the pain uſually becomes leſs. A tenſive pain in the neck, occaſioned by ſitting or lying in an uneaſy poſture, uſually called a *crick in the neck*, is alſo to be enumerated among the partial *ſpaſms*; and finally, theſe affections are not reſtrained wholly to the external parts, but often ſeize alſo upon the internal, as the œſophagus, the ſtomach, the bladder, &c.

It is a common error to confound the word *ſpaſm* with *convulſion*; their difference is evident, the one being ſtationary and immoveable, the other erratic, and flying from one part of a muſcle to another, and from one muſcle to another; the convulſion alſo uſually extends itſelf farther than the *ſpaſm*, and is greater in degree; and finally, the *ſpaſm* is a much leſs dangerous complaint than the convulſion. Men are more ſubject to *ſpaſms* in general than women, and among them, ſuch as are of a ſanguine and plethoric habit, are moſt of all ſubject to them. The general cauſe of *ſpaſms* is an abundance of blood in a body where the veſſels are ſmall, and nature is endeavouring to throw off the load of the plethora from veſſels, where it is troubleſome to her, by this means; which, though an erroneous one, is therefore not without its end.

Prognoſtics in SPASMS. The univerſal *ſpaſms* are greatly the moſt dangerous, as they are frequently attended with internal inflammations; and the partial *ſpaſms* too often degenerate into convulſions. If *ſpaſms* are very frequent in young people, they are to be ſuſpected of threatening arthritic complaints in old age; and when perſons have been free from *ſpaſms* in their youth, and become ſubject to them when old, it is much to be feared that they portend apoplexies, palſies, and ſuffocative catarrhs: and in general all *ſpaſms*, as they are in reality no other than the incomplete attempts of nature to free herſelf of ſomewhat that offends her in particular parts, portend ſome worſe miſchief, when they are obſerved to return frequently, and with violence. *Spaſms* happening in acute diſeaſes, and from wounds, are all very dangerous ſymptoms, and threaten convulſions, and other miſchiefs.

Method of cure. The means to be uſed, when the fits are off, are bleeding in any manner, by the lancet, by leeches, or by cupping, as may be moſt proper in regard to the part principally affected, and other circumſtances; after this the primæ viæ are to be cleared by purges from any foulneſſes that may adhere to them; and finally, ſuch medicines are to be given, as are known to attenuate the blood; and with all this, gentle exerciſe is of great ſervice. In the time of the fit, lenient and paregoric medicines of this kind are amber, and the ſpirit of hartſhorn: to theſe are to be added the acrid vegetables, ſuch as the more temperate carminatives, and the emulſive diluent medicines, with nitre and cinnabar. This laſt drug is famous alone in all theſe caſes, and indeed in all emotions of the blood; but neither this, nor any of the others, will take effect till after bleeding, if the *ſpaſm* be violent. The volatile alkalis alſo ſucceed beſt when mixed with a fixed one; ſuch as the ſpirit of hartſhorn with the tincture of ſalt of tartar, or of antimony. *Junker*'s Conſp. Med. p. 612. See CONVULSION, *Appendix*.

SPATAGOIDES, in natural hiſtory, the name of a genus of the *echini marini*, the characters of which are; that it has the aperture for the anus on one ſide of the upper ſurface, and has a large furrow on the back, which makes it of a cordated form; but has no furrows on the vertex, but only four or five ſmooth rays, made of a number of ſlight tranſverſe ſtriæ. See Tab. of Teſtaceous Animals, N° 14.

SPATANGI, in natural hiſtory, the name of a genus of the *echini marini*, including all thoſe which are marked in the ſhape of a heart, and have the aperture for the anus in one of the ſides of the upper ſuperficies. Theſe have all a remarkable furrow on the back; their baſe is nearly flat, and they have ſeveral furrows on the vertex. By theſe characters they are diſtinguiſhed from the briſſi, with which they have in common the marks of two lips to their mouth, and want the teeth the other kinds have. See Tab. of Teſtaceous Animals, N° 11. *Klein*'s Echin. p. 35.

SPATHA, is a word uſed by different authors in various ſenſes; ſome expreſs by it a rib; others the inſtrument called by ſurgeons a *ſpatula*, and uſed for ſpreading ointments and plaſters; and Celſus calls a ſort of inciſion-knife by this name. It is alſo uſed for the external covering of the fruit of the palm-tree, and by others for a ſword. This laſt is indeed its proper ſignification, and all the others are only metaphorical applications of it to different things, which bear ſome reſemblance to a ſword.

SPATHA, among botaniſts, 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.

SPATHA, among the Romans, is sometimes taken for a broad sword, sometimes for a sort of ladle used by cooks, and also for a surgeon's instrument. *Pitisc.* in voc.

SPATHALIUM, among the Romans, an ornament which the women wore about their hands, not unlike the coral ones of the moderns. *Pitisc.* in voc.

SPATHESTER, the name of a chirurgical instrument used to draw the prepuce over the glands.

SPATHINUS, in natural history, a name given by the Greeks to the stag, or deer, when in its second year.

In the first it was called *nebrus*; in the third year *dicrotus*; and after this *cerastes* as long as it lived.

SPATHOMELE, a word used by some to express the spatula, and by apothecaries and surgeons in mixing and spreading ointments and plasters.

SPATLING-*poppy*, a name given to the common field-lychnis, from the white froth found on it in the spring. See the article FROTH-*spit*.

SPATULA, (*Cycl.*)—The use of the *spatula* is 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 frænum is to be divided; for which purpose it has a fissure at its extremity, and should rather be made of silver than of any other metal.

These *spatulæ* are made of different shapes. Vid. *Heister*'s Surg. Introd. sect. 36. and Plate I. P. Q. R.

SPAX, a name given by some authors to the common tænia, a small fish of the anguilliform-kind, frequent on the shores of Italy. *Rondelet.* de Pisc. p. 112.

SPEAR, in the manege. The feather of a horse, called the *stroke of the spear*, is a mark in the neck, or near the shoulder of some Barbs, and some Turky and Spanish horses, representing the blow or cut of a *spear* in those places, with some resemblance of a scar. This feather is an infallible sign of a good horse.

SPEAR-*hand*, or *sword-hand* of a horseman, is his right hand.

SPEAR-*foot*, of a horse, is the far-foot behind. See the article FAR, *Appendix*.

SPEARWORT, the English name of the *ranunculus flammeus*. See the article RANUNCULUS.

This is with us generally esteemed a poison, but the Scotch use it as a medicine. They beat it, and squeeze out the juice, which they take as a purge, drinking a little melted butter or oil before and after it, to prevent its taking the skin off from the throat. It operates very violently, but with their robust constitutions it does very well.

They use it also externally in cases of pain in the head, or any other part of the body. They bruise the leaves to a sort of paste, and apply them to the part; they soon raise a blister, and a large quantity of water is discharged, after which the pain goes off. This is a short way of blistering, and answers as safely, and as well as ours by the cantharides: but it is a wonder that people, who see this quality in the plant, should dare to take it into their mouths and stomachs.

SPECIES (*Cycl.*)—It has been generally allowed to be true, that no *species* of animal, once created, ever became extinct, or ever will be: but though this may be true in general, yet it does not follow, but that a whole species of animals may be extinct in some particular place by various accidents.

This seems to have been the case with the great moose-deer, now found only in America, which was certainly once an inhabitant of Ireland, though now extinct there, and that so long ago, that no historian mentions its ever having lived there.

There are many animals, as well as trees and plants, common to America and to Ireland. The horns of the moose-deer are found with the bones of the head, and sometimes with other bones, in immense quantities, to this day, in that kingdom, buried in strata of marl at great depths. The writers of fossils, who are fond of resolving every thing into the effects of the deluge, affirm, that these horns were brought from some other country by the waters of the flood; but they seem to be as improbable things to be brought by the sea, and left uninjured in other countries, as can well be conceived; and they are too little altered, and too well preserved, to suffer an unprejudiced observer to agree to this account.

We find numerous instances of the surface of the earth altering, in length of time, in many parts of this kingdom; and it is no forced judgment to determine, that the soil, in which these horns are now found buried, was once the surface of the country, though other substances have been since piled upon it, and made a surface over it. The creatures, whose horns we find buried, probably lived on the island when this was the surface; and as they live in herds, so dying in herds, or at least several together, their bodies were left in heaps upon the surface, where they were afterwards consumed and wasted, only the tough substance of the horns preserving them, they have remained, and being covered with the superadded strata, are now found in this fossile state. In countenance of this opinion it is to be observed, that the deer-kind in general are subject to contagious diseases, which often carry off great numbers of them. The rein-deer in Lapland are sometimes almost all destroyed by these diseases; and it is not impossible that such a distemper, raging longer and more violently than ordinary, might destroy the whole *species* in this place. The inhabitants might also promote the destruction by their hunting; for we see by the destruction of the wolves, once so frequent in this kingdom, that this cause alone may be sufficient to extirpate, or extinguish the race of an animal in one kingdom. Phil. Trans. N° 27. p. 501.

What the accurate Artedi has given, as the definition of the *species* in ichthyology, is not confined to fishes alone, but, with proper regulations, may be made the basis of real distinctions of *species* in all other natural bodies. Every fish, which differs from all the other fishes of the same genus in some external part, whether that difference be in excess or defect, in number or in proportion, or even in colour, provided that the difference be fixed and invariable, is properly to be called a distinct *species*. *Artedi*'s Ichthyolog.

The specific differences of fishes are to be drawn from these circumstances; but it is not to be supposed that every *species* differs in all of them, sometimes only one, sometimes more, occasion the variation. See SPECIFIC *names*.

If any one fish, in regard to all the others of the same genus, is found to be possessed of some external part which they all want; as for example, if it have cirri, tubercles in the shape of horns on the head, spines or prickles in the head, or on any other part of the body, the fish is then to be esteemed a distinct *species*. If one fish differs from the others of the same genus in the number of any parts, as fins, spines, or tubercles, it is then also a distinct *species*. If one fish differs from another in the proportion of any essential part, as in the having longer jaws, longer teeth, or the like, it is also to be esteemed a truly different *species*. If one fish differs from another in the figure of some essential part, as of the snout, the back, the teeth, or the tail, or the lineæ laterales, it is to be esteemed a distinct *species*. If one fish differs from another of the same genus in the excess of parts, having some part that is deficient in the other; or if in the number, proportion, or figure of some of the essential parts; the distinction will be the more evident as the greater number of parts differ, and the *species* will easily be found to be truly distinct. *Artedi*'s Ichthyolog.

If a fish differs from all the others of the same genus in colour, while it has no other distinction from some of them, then it is to be examined whether the colour is always permanent and invariable; if not, there is no distinction of *species* to be founded upon it; but if it be, it remains a matter of doubt whether it may be esteemed a specific difference, colour being one of the least essential characters, and, according to Linnæus, what no distinction of *species* can be founded on. As the colour of fishes is very apt to vary, even in the same *species*, and to be sometimes more intense, sometimes more remiss, this is to be considered in a due light, before any judgment is formed on it; and it is to be observed whether the colour, that makes the difference, be wholly of another nature, or only different in degree. The *perca fluviatilis* of Bellonius will be sometimes pale yellow, sometimes deeper, and sometimes even black, according as the water is clear or more muddy; and thus whatever differences are only in degree of the same colour, or in the changes from that degree toward black, without the intermixture of any other colour, are not to be at all depended upon. *Linnæi* Fund. Bot. 27.

We are not to expect the same precision in the differences of the truly distinct *species* of all the genera of fishes: in some they are found so obvious, and so great, that the first look distinguishes them; but there are some other genera, in which the several *species* are so alike one to the other, in the essential characters, that though there is a general external face, in which they all vary, yet it is not easy to say in what the distinction between *species* and *species* consists. Thus, among the several *species* of salmons, the number and figure of the essential parts is the same in all, and their proportion, in regard to the bulk of the fish, differs but little; the jaws are in some indeed wider, and in others longer, but it is not much. The colours and spots vary indeed greatly, in the different *species*, but then it must be allowed, that they also differ in the several individuals of the same *species*: so that, upon the whole, there is no genus of fish, in which the *species* are so difficultly distinguished. The very bones of the fins, which differ in the several *species* of the same genus, in almost all other fishes, are the same in these. The number of the vertebræ is almost the only mark in which the real difference of these consists: this is a troublesome thing to count, but in the boiled fish it is best done, and is always certain, the number being the same in all of the same *species*, of whatever size, and the several *species* all differing as to this number. Great care is to be taken in the counting of these, and by that means the smallest fish and the largest will be found to have the same number, if of the same

ſame *ſpecies*. There are ſome few inſtances of the different *ſpecies* of the ſame genus having the ſame number of vertebræ, but this is very rare. Artedi tells us that he never obſerved it but in a few of the cyprini; and thoſe which have no diſtinction in this character, he obſerves, have ſuch very remarkable external differences, that it is not needful to look for others.

SPECIES *aromaticæ*, a new name given in the late London Diſpenſatory to the compoſition uſually called *ſpecies diambræ*. The College obſerved, that the intention of this medicine was beſt anſwered, by compoſing it of ſuch ſpices as the daily experience of the table ſhews were moſt grateful to the ſtomach, and by avoiding all ingredients which, though of the aromatic kind, are accompanied with any thing nauſeous and diſguſtful in their flavour; and therefore have ordered it to be now made in the following manner. Take cinnamon two ounces, cardamom ſeeds, ginger, and long pepper, of each an ounce; make all together into a fine powder. *Pemberton*'s Lond. Diſp. p. 318.

SPECIES *e ſcordio*, the ingredients of the diaſcordium electuary in a dry form. The recipe is ſomething altered in the late London Pharmacopœia, and ſtands thus: take bole armenic four ounces, ſcordium two ounces, cinnamon an ounce and half, ſtorax, roots of tormentil, biſtort, gentian, dittany of Crete, galbanum, and gum arabic and red roſes each an ounce, long pepper and ginger each half an ounce, opium three drachms; this may be left out at pleaſure; and all are to be beat to a fine powder. *Pemberton*'s Lond. Diſp. p. 319.

SPECIES, in muſic. Here, as in other arts, *ſpecies* denotes the ſubdiviſions of the genus. The antients had three genera, the *enharmonic*, *chromatic*, and *diatonic*. The *enharmonic* had no ſubordinate *ſpecies*. The *chromatic* genus was divided into three *ſpecies*, viz. the *molle*, *ſeſquialterum*, and *toniæum*; or, as others call them, *molle*, *hemiolium*, and *toniçum* [c]. And laſtly, the *diatonic* genus was ſubdivided into the *molle*, and the *intenſum*; ſo that the antients had ſix *ſpecies*, or diviſions of the fourth in uſe. Some of theſe are alſo in uſe among the moderns, but others are unknown, as yet, in theory or practice [d].—[[c] *Wallis*'s Append. Ptolem. Harm. p. 164. [d] Vid. Phil. Tranſ. N° 481. p. 271, ſeq.] See the articles ENHARMONIC, CHROMATIC, and DIATONIC. See alſo GENUS.

SPECIES is alſo applied, in antient muſicians, to the different diſpoſitions of the tones and ſemitones in a fourth, fifth, or octave. Hence they ſay there are three ſpecies of fourths, four of fifths, ſeven of octaves. *Wallis*'s Append. Ptolem. Harm. p. 171.

The Grecians expreſſed this ſenſe of the term *ſpecies* by εἶδος, or by σχημα [e]. The Latin word, *figura* [f], has alſo been taken in the ſame ſenſe.—[[e] *Ariſtox.* p. 6, 74. Ed. Meib. [f] *Wallis*, ibid. p. 170.]

Change of SPECIES. The *change of ſpecies* is a term uſed in huſbandry to expreſs an expedient the farmer often has recourſe to, in order to procure good crops: this 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, 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. See SOIL.

This *change of ſpecies* has been a practice of the farmers of all times, and is recommended, and judged neceſſary, by moſt of the writers on this ſubject; but Tull, in his New Syſtem of Horſehoeing Huſbandry, proves, that it is not neceſſary, and that the land only wants proper tillage, when exhauſted by one ſort of corn, to enable it to produce as good crops of the ſame corn again. The three fundamental propoſitions he lays down to prove this, are, 1. That plants of the moſt different nature feed on the ſame ſorts of food. 2. That there is no plant but what muſt rob every other plant, within its reach, of a part of its nouriſhment. And 3. that a ſoil, which is once proper for any kind of vegetable, will continue to be always proper for it, in reſpect to the ſort of food it gives. If only any one of theſe propoſitions were true, it would follow, that there is no need of a *change of ſpecies* from year to year; and as they are all ſo, this truth is yet the more inconteſtible, and experience proves it yet more evidently, for the ſame land will produce crops of wheat every year, without any change, only by the practice of the horſehoeing huſbandry, inſtead of the common. *Tull*'s Huſbandry. See the articles FOOD *of plants* and HUSBANDRY.

SPECIFIC (*Cycl.*)—SPECIFIC *operation of medicines*. Dr. Martin endeavours to defend the doctrine of the *ſpecific operations* of cathartic medicines, from the different nature of the drugs, and by an appeal to experience. See his Eſſ. Phyſ. and Medic.

SPECIFIC *gravity of metals*. See METALS.

SPECIFIC *names*, in natural hiſtory, are thoſe epithets compoſed each of one or more terms, and placed after the generical name, in the denomination of any ſpecies of plant, animal, or mineral, expreſſing thoſe characters by which it differs from all the other ſpecies of that genus.

The more accurate of the modern naturaliſts have, in their ſeveral provinces, ſet about the reformation of the *ſpecific* names of things. They firſt obſerve, that many of the *ſpecific* names of the antients no way anſwered the intent of their formation, but expreſſed the more trivial diſtinctions, or accidents, while they omitted the realities, and more eſſential grounds of diſtinction. On this foundation the critical writers of our times diſtinguiſh the old *ſpecific* names into the genuine, or true, and the ſpurious, or falſe ones.

The genuine names are thoſe which expreſs thoſe characters, by means of which the thing becomes a different ſpecies; theſe are invariable, and by theſe names the thing is, in ſome ſort, deſcribed. The falſe ones are thoſe *ſpecific* names which do not, nor cannot diſtinguiſh the ſpecies, called by them, from the others of the ſame genus, which may as well belong to ſome other ſpecies as to that, and which therefore are of no uſe to the ſtudent. The true formation of theſe names is on the real characters of the body to be named; but inſtead of this theſe falſe ones are formed, from the following accidental, or variable diſtinctions.

1. From the fiſh being common, or ſcarce. On this difference are founded the diſtinctions of fiſh, for inſtance, in their *ſpecific* names, into *vulgaris* and *rara*; and thus authors abound with *acus vulgaris*, *lupus vulgaris*, *boops rara*, and the like. Names are meant to convey ſome idea of the nature of the thing, but what do theſe convey? or how is the perſon, who is ſhewn a fiſh he does not know, to find out whether it be ſcarce or common?

2. From the number of the ſpecies of ſome genus. Thus we find *acus prima*, and *acus altera*, and the *aſellus primus*, *ſecundus*, *tertius*, and ſo on, in many other genera: theſe convey even leſs than the former.

3. Some of the *ſpecific* names of the antients are formed of the place, or habitation of the creatures. Of this nature are the *alburnus lacuſtris*, the *apua phalerica*, the *brama marina*, the *lampetra fluviatilis*, and a thouſand others; either alluding to the nature of the water, or peculiar place where the fiſh firſt met with, of this genus, chanced to be found.

4. Some are formed on the value or baſeneſs of the fiſh. Of this kind are the *ſalmo nobilis*, the *albula lauta*, the *aſellus luſcus*, the *ſalmo ſpurius*, ſo called, from its not having the fine flavour of the other, and ſo on.

5. The different bigneſs is another foundation of theſe names: thus we have the *acus major*, *albula parva*, *bugloſſus maximus*, *harengus minor*, and the like.

6. The colour, though very variable, or only confined to one part of the fiſh, has given occaſion to others; and in theſe it has been expreſſed, as if generally diffuſed over the fiſh. Thus the *albula cærulea* has only a part blue, though the name ſeems to expreſs that the whole is ſo: the *aſellus flaveſcens*, and *vireſcens*, are names of the ſame kind, the yellow and green expreſſed in them not being general, but only partial: the *torpedo maculoſa*, and *non maculoſa*, ſeem to expreſs two ſpecies different only in the ſpots, whereas theſe ſpots appear and diſappear at times in the ſame *ſpecies*. All theſe, and many hundred others, founded on the ſame principles with theſe, are falſe and ſpurious, and not at all anſwering the intent of *ſpecific* names, nor diſtinguiſhing the fiſhes one from another. An unknown fiſh carries no figures of 1, 2, 3, &c. marked on it, to ſay whether it be the firſt, ſecond, or third of the author who deſcribes it; nor can it be known, at ſight, whether it be a native of ſalt or of freſh water, whether it lives in rivers or in ponds, and whether it be of American, Aſiatic, or European origin; neither can the taſte, the nature, or the manner of life of the fiſh, be ſeen on the outſide of its body: all theſe, therefore, are to be baniſhed from the names, though they make a proper part of the hiſtory of the ſpecies. On firſt meeting with a fiſh, can any man judge whether it be the greateſt, the middle, or the ſmalleſt of its kind, or ſay whether it is longer or broader than the reſt, before he knows them? nor can the mention of a colour ſignify any thing, when it is not ſaid what part of the fiſh is tinged with it. As the properties, on which theſe *ſpecific* names are founded, cannot be known till the fiſh is well known, and as the uſe of the name is the leading the perſon, yet ignorant, to know it, it follows that all theſe names are falſe, frivolous, and abſurd, and yet theſe are the names by which almoſt all the old authors have called them.

The true, and genuine *ſpecific* name, on the other hand, is that which diſtinguiſhes the fiſh called by it, at firſt ſight, from all the others of the ſame genus; or which, if it require thought and deliberation, yet requires no perſon's knowledge of the fiſh.

Theſe *ſpecific* names are to be taken from ſome external part, which in that peculiar ſpecies differs from thoſe of all the others, either in regard to exceſs, defect, number, proportion, or invariable colour.

The *ſpecific* names, taken from the exceſs of the parts, or from ſome particular parts which that ſpecies has, and which the others want, are preferable to all others. The principal parts, which ſometimes are in exceſs, ſometimes are deficient, and therefore give the proper origin to theſe names, are theſe. The *cirri*, or long-ſhaped fleſhy filaments hanging from the mouth; the tubercles, which in the heads of ſome fiſhes imitate horns; the prickles which are on the heads, and other parts; and the prominences, and other ſoft apophyſes; and other ſuch remarkable things, in whatever part of the body. Inſtances of proper *ſpecific* names, founded on the exceſs or defect of theſe parts, are theſe. *Gadus ore cirrato*, and *gadus cirris carens*. *Cottus cornubus quatuor in capite*. *Cottus cornubus capitis carens*, &c.

After theſe, the beſt names are thoſe which are taken from the number of certain parts differing in exceſs, or ſmall numbers, in the ſeveral ſpecies. The fins, and their bones, and the prickles of them, are parts which give theſe names, as alſo the ſpines on the heads and bodies of ſome fiſhes, and the *lineæ laterales*, or ſide lines, and the teeth.

Of this kind are thoſe expreſſive *ſpecific* names of the *gadus dorſo dipterygio*, *gadus dorſo tripterygio*, *gaſteroſteus aculeis decem*, &c.

Others of theſe names are taken from the proportion of ſome two parts one to another. The difference of this kind is generally in regard to length; and the parts alluded to, are the jaws, the teeth, *&c.* Of this ſort are the *clupea mandibula ſuperiore longiore*, and the like. In the ſquali, and ſome other cartilaginous fiſhes, the upper part of the tail is always longer than the under part; but as this holds in all the genus, there can be no uſe made of it as a *ſpecific* character.

Others of theſe names are made from the figure of ſome particular part, different from the reſt of the genus. The parts alluded to in theſe names are generally theſe; the ſnout, the back and belly, the tail, the lateral line, and the fixed ſpots and colours. The ſnout of any ſpecies, when different from that of the others of the ſame genus, in being conic, depreſſed, or compreſſed, or long and cylindric, gives great opportunity of good names of this kind. Thus we have the names of *coregonus roſtro conico*, and *coregonus roſtro depreſſo*, and the like. The back and belly, when plane ridged, or carinated, give occaſion to *ſpecific* names in the ſame manner; the cyprini in particular give us inſtances of this. The tail gives alſo occaſion to many names, as it is cuſpidated, rounded, ſtrait, lightly hollowed, or forked; and the lateral lines give the ſame occaſions of names, as they are ſtrait, crooked, ſingle, double, *&c.* The ſpots, provided they are permanent, are good for the baſis of *ſpecific* names, expreſſing whether they are round or long, large or ſmall, ſtrait, or tranſverſe. The ſituation of the fins, and other parts, is generally ſo regular in all the ſpecies of the ſame genus, when that genus is naturally eſtabliſhed, that very little can be done in the making names from them as *ſpecific* ones; but this ſituation of the parts is of the utmoſt uſe in the generical diſtinctions.

All *ſpecific* names, founded on theſe characters, are genuine and proper, and ſupply real notes for the diſtinguiſhing the ſpecies; and whoever will examine together all the ſpecies of any one genus, however badly named by the old authors, will find, in all the really diſtinct ſpecies, marks ſufficient for the making ſuch names as are here preſcribed. No fiſh can want theſe, ſince its being a diſtinct ſpecies from the reſt conſiſts in ſome of the articles, on the deſcription and diſtinction of which that name is to be formed. *Artedi*'s Ichthyology.

SPECTABILES, among the Romans, a title of honour given to the ſecond rank or degree of nobility under the Roman emperors, being unknown in the time of the republic. There were other two degrees; the firſt had the title of *illuſtres*, and the third that of *clariſſimi*. *Pitiſc.* in voc.

SPECTER, in conchyliology, a name given by the French naturaliſts to a ſpecies of *voluta*, on which there are ſeveral reddiſh broad bands, compoſed of looſe and irregular figures; the ground colour is a fine white. They are called by Latin writers *concha ſpectrorum*. See CONCHA.

SPECTRORUM *candela*, in natural hiſtory, a name by which ſome have called the belemnites. See the article BELEMNITES.

SPECULA, among the Romans, were places whence a good view might be had of what was doing at a diſtance. The word is particularly uſed to ſignify watch-towers and beacons. *Pitiſc.* in voc.

SPECULARES, in natural hiſtory, the name of a genus of foſſils of the claſs of the talcs.

The word is derived from the Latin, *ſpeculum*, a looking-glaſs; the bodies of this kind being naturally of bright gloſſy and poliſhed ſurfaces, and in the thicker maſſes not tranſparent, but reflecting the images of things.

The *ſpeculares* are talcs, compoſed of viſibly ſeparate plates of extreme thinneſs, and each fiſſile again into a number of others yet finer. See Tab. of Foſſils, Claſs 1.

The bodies of this genus are the common Muſcovy talc; the *ſpecularis lucida fuſca*, or brown talc, a ſpecies little inferior to the former in beauty, and found in Germany and England; and the *ſpecularis amethyſtina*, called *talc rouge*, or red talc, by the French. This is found in Muſcovy and Perſia, and no where elſe, as far as is yet known, and is often imported into France in maſſes, which are of a beautiful purple: we have of it brought into England, but only in thin flakes, fit for the covering miniature pictures. In theſe flakes it has none of the redneſs natural to it in the lump, but is the fineſt and moſt tranſparent of all the talcs. *Hill*'s Hiſt. of Foſſils, p. 71. 74.

Pliny, and other of the antient writers, as well as ſeveral of the moderns, uſe the term *ſpecularis lapis* for that ſpecies of talc, commonly known by the name of *iſinglaſs*, or *Muſcovy glaſs*.

This has been a ſubſtance in great uſe among mechanics, from the earlieſt times we have any accounts of. It is found in broad flat maſſes of ten or twelve inches in breadth, and from half an inch to three inches in thickneſs; and is compoſed in theſe of an almoſt infinite number of broad and beautifully even plates, or flakes, laid with a perfect regularity on one another, and ſeldom parting naturally from each other, though by art they may be divided, almoſt without end, into broad and extremely thin laminæ. Theſe are very flexile and elaſtic, and make no efferveſcence with aqua fortis. By the laſt of theſe properties they are diſtinguiſhed from the plated ſpars which ſome have confounded with them, and by their elaſticity from all other foſſile bodies.

It is found in many parts of the world. The iſland of Cyprus abounds with it. It is very common alſo in Ruſſia, and has of late been diſcovered to abound in the Alps, the Apennines, and many of the mountains of Germany. It is imported in large quantities into England, and is uſed by the lanthorn-makers inſtead of horn, in their nicer works; by the painters to cover miniature pictures; and by the microſcope-makers to preſerve ſmall objects for viewing by glaſſes. The antients uſed it inſtead of glaſs in their windows. *Hill*'s Hiſt. of Foſſils, p. 72.

SPECULARIA, among the Romans, a kind of window-caſements, which were uſed before glaſs was introduced for this purpoſe. They conſiſted of tranſparent ſtones, called *lapides ſpeculares*. *Pitiſc.* in voc. See SPECULARIS *lapis*, *Cycl.* and *Suppl.*

SPECULARIS *lapis*. See SPECULARES, ſupra.

SPECULATION (*Cycl.*)—SPECULATION-*ſhell*, in natural hiſtory, a name given by the French writers to a very beautiful ſpecies of the *voluta*, uſually called by us the *Guinea-ſhell*, from its being brought from that part of the world. See the article VOLUTA.

SPECULATIVE (*Cycl.*)—SPECULATIVE *muſic*, called by the Italians *muſica ſpeculativa*, or *theorica*, that which treats only of the ſounds, examines their natures, properties, and effects, without regard to the executive part.

SPECULUM (*Cycl.*)—SPECULUM *linguæ*, a chirurgical inſtrument. See GLOSSOSPATHA.

SPECULUM *indicum*, an affected term uſed by ſome chemical writers to expreſs filings of iron.

SPEEDWELL, *veronica*, in botany. See the article VERONICA.

We have ſeveral of the exotic kinds of this plant propagated in the gardens of the curious. They may all be raiſed from ſeeds, but their roots encreaſe ſo faſt, that they are uſually propagated by parting them. The beſt ſeaſon for doing this is in September, and the ſummer following they will produce their flowers in full perfection. They will grow in any ſituation, but they thrive beſt in a freſh ſoil, that is not too wet. They require no care but the being kept clear from weeds, and having their roots parted every autumn, otherwiſe they multiply too faſt, and both choak up themſelves, and injure whatever is near them. *Miller*'s Gard. Dict.

SPEISSE, in mineralogy, a name given by the Germans, and other workers on cobalt, to a ſort of impure regulus of biſmuth, ſometimes occurring in their proceſſes.

It is not uncommon for ores of biſmuth to be mixed with the cobalt in the ſmalt-works. Both this ore and the cobalt yield the blue vitrifiable earth of which ſmalt is made, but in one of them it is blended with arſenic, and in the other with the biſmuth. The ſeparating it from theſe two minerals requires different proceſſes, and the workmen therefore ſeparate the two minerals, and work each by itſelf; but it ſometimes happens that the ore of biſmuth is ſo like to the true cobalt, that it cannot be diſtinguiſhed by the eye, and ſo intimately mixed with it, that it cannot be ſeparated from it; in this caſe the whole is expoſed to the fire together, and after the arſenic is ſublimed in form of meal, there remains a coarſe and impure regulus of biſmuth, which having mixed itſelf with the earth of the cobalt, and other extraneous ſubſtances, is of a reddiſh white colour, and very impure and friable. This gives them the trouble of a ſecond operation, by which they ſeparate the pure regulus of biſmuth, and the remainder being a mixture of its earth and that of the cobalt, is run together into the blue glaſs, called *ſmalt*, the earth of biſmuth ore being of the ſame nature with that of cobalt. Philoſ. Tranſ. N° 396. p. 199.

SPELTA, in the materia medica, a name uſed for the grain of the zea dicoccos, commonly called *ſpelt corn*. *Dale*'s Pharm. p. 261.

SPELTER (*Cycl.*)—This mineral has been applied lately to ſo large a work as the cylinder of a fire-engine, by Mr. Ford of Colebrook Dale in Shropſhire: it runs eaſier, and caſts as true as braſs, and bores full as well, or better, when warmed a little. While cold it is as brittle as glaſs, but the warmth of the hand will make it ſo pliant, that a ſhaving of it may be wrapt round the finger like a bit of paper. This metal never ruſts, and therefore works better than iron; the ruſt of which, upon the leaſt intermiſſion of working, reſiſts the motion of the piſton. Philoſ. Tranſ. N° 482. ſect. 6.

SPENT, at ſea. The ſeamen ſay a ſhip hath *ſpent* any maſt, or yard, when it is broken down by foul weather, or any ſuch accident; but if it be done by an enemy's ſhot in a fight, they ſay, *ſuch a yard*, or *maſt*, *was ſhot by the board*.

SPERAGE, *aſparagus*, in botany. See ASPARAGUS.

The propagation of this uſeful plant is from ſeed; and as much of the ſucceſs depends upon the goodneſs of the ſeed, it is much better to ſave it than to buy it at the ſhops. The manner of ſaving it is this: mark with a ſtick ſome of the faireſt buds, and when they are run to berry, and the ſtalks begin to dry and wither, cut them up; rub off the berries into a tub, and pouring water upon them, rub them about with your hands, the huſks will break and let out the ſeed, and will ſwim away with the water in pouring it off; ſo that in repeating this two or three times, the ſeeds will be clean waſhed, and found at the bottom of the tub. Theſe muſt be ſpread on a mat to dry, and in the beginning of February muſt be ſown on a bed of rich earth: they muſt not be ſown too thick, and muſt be trod into the ground, and the earth raked over them ſmooth; the bed is to be kept clear of weeds all the ſummer, and in October, when the ſtalks are withered and dry, a little rotten dung muſt be ſpread half an inch thick over the whole ſurface of the bed.

The ſpring following the plants will be fit to plant out for good; the ground muſt therefore be prepared for them by trenching it well, and burying a large quantity of rotten dung in the trenches, ſo that it may lie at leaſt ſix inches below the ſurface of the ground: when this is done, level the whole plot exactly, taking out all the looſe ſtones; this is to be done juſt at the time when the *aſparagus* is to be planted out, which muſt be in the beginning of March, if the ſoil is dry, and the ſeaſon forward; but in a wet ſoil, it is better to wait till the beginning of April, which is about the ſeaſon that the plants are beginning to ſhoot.

The ſeaſon being now come, the roots muſt be carefully taken up with a narrow-pronged dung-fork, ſhaking them out of the earth, and ſeparating them from each other, and obſerving to lay all their heads even, for the more convenient planting them, which muſt be done in this manner.

Lines muſt be drawn, at a foot diſtance each, ſtrait acroſs the bed, theſe muſt be dug into ſmall trenches of ſix inches deep, into which the roots muſt be laid, placing them againſt the ſides of the trench with their buds in a right poſition upwards, and ſo, that when the earth is raked over them, they may be two inches under the ſurface of the ground. Between every four rows a ſpace of two feet and a half ſhould be left for walking in, to cut the *aſparagus*. When the *aſparagus* is thus planted, a crop of onions may be ſown on the ground, which will not at all hurt it.

A month after this the *aſparagus* will come up, the crop of onions muſt then be thinned, and the weeds carefully cleared away. About Auguſt the onions will be fit to pull up. In October following cut off the ſhoots of the *aſparagus* within two inches of the ground, clear well all weeds away, and throw up the earth upon the beds, ſo as to leave them five inches above the level of the alleys. A row of colworts may be planted in the middle of the alleys, but nothing muſt be now ſown on the beds. In the ſpring the weeds muſt be houghed up, and all the ſummer the beds kept clear of weeds. In October they muſt be turned up, and earthed again, as the preceding ſeaſon.

The ſecond ſpring after planting, ſome of the young *aſparagus* may be cut for the table. The larger ſhoots ſhould only be taken, and theſe ſhould be cut at two inches under ground, and the beds every year managed as in the ſecond year. *Miller*'s Gard. Dict.

SPERMACOCE, the name of a plant which, according to the Linnæan ſyſtem of botany, makes a diſtinct genus, the characters of which are; that the calyx is a very ſmall perianthium, divided by four notches at its extremity, placed on the germen, and remaining when the flower is fallen. The flower conſiſts of one leaf, which forms a tube longer than the flower, with its extremity divided into four ſegments, ſomewhat bent back, and obtuſe. The ſtamina are four pointed filaments, ſhorter than the flower. The antheræ are ſimple. The germen of the piſtil is roundiſh, flatted, and ſituated below the receptacle. The ſtyle is ſingle, but bifid at the top. The ſtigmata are obtuſe. The fruit is compoſed of two oblong capſules growing together, convex on one ſide, and flat on the other, obtuſe, and each furniſhed with two horns. The ſeeds are ſingle and roundiſh. *Linnæi* Gen. Plant. p. 25.

SPERMATOPŒA, a name given to ſuch medicines as are ſuppoſed to encreaſe the ſemen.

SPERVERIUS, in zoology, a name by which Bellonius, and ſome other authors, have called the ſparrow-hawk, more commonly known by the names of *niſus*, and *accipiter fringillarius*. *Ray*'s Ornitholog. p. 52. See the article FRINGILLARIUS *accipiter*.

SPHACELUS (*Cycl.*)—In caſes of a perfect *ſphacelus*, or mortification, where the parts are become abſolutely dead, and wholly without ſenſe, and ſoft, ſo as to retain the impreſſions of one's fingers ends, and are plainly fetid and corrupted, all the medicines in the world will be ineffectual to reſtore the part to its life and ſenſe 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 is to be taken, however, in this operation, according to the degree of the ſymptoms, and nature of the part affected.

If only ſome extremity of the foot, tarſus, metatarſus, or inſtep, or only the bare ſkin and fat are *ſphacelated*, which is ſometimes the caſe, the whole foot is not to be amputated in that caſe, but preſerving the limb entire, the ſurgeon is only to remove that part which is vitiated; and that is frequently beſt of all done by ſuppuration, or if not to be effected by that means, may be attempted by the cauſtic. 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 ſeparated 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 very 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 part, and frequently repeated, till it is ſeen that the diſorder ſpreads no farther; which is known to be the caſe, when we ſee the tumor of the vitiated parts ſubſide, and the edges of the ſound parts become tumid all round; and on the ſecond or third day after this a ſuppuration is uſually formed, and the ſound parts gradually become ſeparated from the vitiated. After this, to ſoften and promote a ſpeedy ſeparation of the eſchar, the following cataplaſm is always found highly ſerviceable. Take of ſcordium two handfuls, mallows, marſhmallows, 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 flour of linſeed, one ounce of linſeed oil, and two ounces of ſal armoniac. This is to be applied warm over the whole, and retained in a proper degree of heat, 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. After theſe methods 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 ſeparation of the vitiated parts will very ſhortly follow.

When this ſeparation ſhews itſelf beginning, it muſt 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 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 again 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 ſciſſors, or ſcalpel, to divide them, this is always to be done with very little, either of pain or of 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 then the cure is eaſily perfected in the common way.

This is the gentler, and more 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 liquefied, 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 theſe 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 before ordered cataplaſm: this application is to be continued till the corrupted part 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. Several great authors, however, adviſe the uſing the knife, and actual cautery in theſe caſes, dividing and burning down to the ſound parts; but the cruelty of this method, and the pain, and ſometimes danger that attend it, make the methods of cure by ſuppuratives, and mild cauſtics, much to be preferred: indeed, the ſurgeons in general are not now ſo fond of calling in the actual cautery as formerly.

Finally, when the *ſphacelus* is ſo deeply affixed in any part of the upper or lower extremity, that it has penetrated thro' the muſcles as far as the bone, and has either reſiſted the force of all medicines, or the proper time for the applying them has been neglected; in this caſe, to preſerve the reſt of the body, the injured part muſt be amputated. *Heiſter*'s Surgery, p. 217.

SPHÆCULÆ, among the Romans, were tickets of wood, *teſſeræ ligneæ*, by which the emperors ſcattered their preſents to people of both ſexes in the theatre, or *circus*. *Pitiſc.* Lex. Ant. in voc.

SPHÆROMACHIA, Σφαιρομαχια, in antiquity, a particular kind of boxing, wherein the combatants had balls of ſtone or lead in their hands, which were called σφαῖραι. *Potter*, Archæol. Græc. lib. 2. cap. 21. Tom. I. p. 448. See the article BOXING.

SPHAGITIDES, a name given by ſome authors to the jugular veins.

SPHAGNUM, in botany, the name of a genus of moſſes, the characters of which are theſe. They produce heads or capſules only of one kind, which differ alſo from thoſe of all the other moſſes, in that they have no calyptra, or other covering: theſe ſtand on very ſhort pedicles, and are therefore ſo guarded by the leaves, as not to need any other covering. The *ſphagna* are divided into two orders, the one comprehending the branched kinds, and the other the unbranched ones: theſe are diſtinguiſhed by ſome by the terms *cauliferous* and *acaulous*. See Tab. of Moſſes, N° 8. *Dillen.* Hiſt. Muſc. p. 242.

Of the firſt order there are nine known ſpecies. 1. The larger ſoft and hollow-leaved bog-*ſphagnum*. This grows in wet places in vaſt beds, and riſes to a foot high, with cluſters of leaves at the heads of all the branches. 2. The ſoft bog-*ſphagnum* with finer leaves. This is as tall, or more ſo, than the former, but is much ſlenderer, and the leaves much ſmaller and finer. The firſt is uſually of a dead white, and this laſt of a ſomewhat reddiſh hue. 3. The bright green-pointed *ſphagnum* with oval heads. This grows in large tufts in the boggy places on the Welch mountains. 4. The rough *ſphagnum* with red heads. The ſtalks of this are not above an inch long, and not branched, but folded, and interwoven one with another into thick tufts. It uſually grows upon rocks, but ſometimes on the ſtumps of old trees. 5. The hoary nodoſe *ſphagnum*. This is all over hairy, the ſtalks are ſomewhat longer than thoſe of the former kind, and the heads are ripe in December. This uſually grows on the ſtumps of old trees. 6. The *ſphagnum* with numerous heads, all bending one way. This is very common on the ſtumps of old trees, and produces its heads in November. It is of a very lively and pleaſant green. 7. The plain-feathered *ſphagnum*. This is an elegant ſpecies, and grows on the bodies of old trees in Patagonia. 8. The wavy-feathered *ſphagnum* with hairy heads. This is of the ſame country with the former, and grows to three or four inches in length. 9. The wavy-feathered *ſphagnum* with ſcaly heads. This is found on the trunks of trees in the woods of Germany. *Dillen.* Hiſt. Muſc. p. 253.

Of the *ſphagna* of the ſecond order, or thoſe which have no branched ſtalks, there are only four known ſpecies. 1. The dwarf hair-leaved *ſphagnum*. This is the ſmalleſt and fineſt of all the plants of this claſs, and is common in ſmall tufts about way-ſides in many places. 2. The larger dwarf bulbous *ſphagnum*. This grows only to the height of a few lines, and is compoſed of numerous leaves, ſurrounding one another ſo, as to form ſeveral bulbs. The heads are eaſier to be diſtinguiſhed by the touch than the ſight, for they lie hid between the leaves, and are ſmaller than poppy-ſeeds. 3. The leſſer dwarf bulbous *ſphagnum*. The leaves of this are much ſmaller than thoſe of the preceding kind. 4. The largeſt dwarf *ſphagnum* with briſtles. The capſules of this ſpecies, as well as the leaves, are much larger than thoſe of any other of the acaulous kinds, and the middle rib of every leaf runs out into a kind of briſtle.

SPHENOIDES (*Cycl.*)—The *ſphenoidal*, or cuneiform bone, is ſituated in the lower part of the cranium, a little toward its forepart, making the middle or baſis of the ſkull, and thence taking its name of *os baſilare*.

It is of a very odd figure, its greateſt extent is tranſverſe, and it may in ſome manner be ſaid to repreſent a bat with its wings extended. Its poſterior, or thickeſt part, by which it is joined to the apophyſis of the os occipitis, may be called its body; the reſt of it is wholly made up of eminences and cavities. And in order to examine theſe methodically, the bone muſt be divided into two ſides, the one external, the greateſt part of which may be ſeen in one entire ſkull, the other internal, which does not appear till the ſkull is opened.

The eminences on the outſide are theſe. Two temporal apophyſes, which are the largeſt of all the proceſſes of this bone, and at the greateſt diſtance from each other, called *the great wings of the os ſphenoides*, and theſe are ſometimes, though rarely, ſeparated from the reſt of the bone by tranſverſe ſutures. Two orbitary apophyſes, which form a conſiderable portion of the orbit next the temples. A ſmall ſharp proceſs, formed like a bird's bill between the orbitary apophyſes. Two pterygoide apophyſes, each of which is divided into two alæ: one internal, which is the largeſt, the other external, the lower end of which is in the ſhape of a hook; and each of theſe alæ is again divided into two ſides, the one internal toward the palate, the other external toward the temples. Two ſpinal apophyſes. A little anterior eminence above the ſharp proceſs, for the articulation of this bone with the os ethmoides; but in ſome ſubjects, inſtead of this eminence, there is only a little notch.

The external cavities of this bone are two portions of the temporal foſſæ; two pterygoide foſſæ; the lower ends of theſe are divided by a little notch, or ſlit, of an irregular figure, which may be called the *fiſſura palatina*: a little oblong foſſula at the root of the internal ala; two ſuperior orbitary, or *ſphenoidal* fiſſures; a little notch at the end of each of theſe fiſſures, for the paſſage of an artery of the dura mater; two temporal notches; two maxillary notches, the edges of which help to form the two inferior orbitary fiſſures, which may be called *fiſſuræ ſpheno-maxillares*: two holes for the ſuperior maxillary nerves; two other holes on one ſide of the former, called *pterygoide*, which, in an entire ſkull, are hid by the other bones: two oval holes, for the inferior maxillary nerves; two little ſpinal holes, each of which tranſmits an artery of the dura mater, but ſometimes theſe are only notches; a little hole between the two maxillary holes; and a little groove on one ſide of the ſpinal apophyſis, which forms part of the euſtachian tube.

The internal eminences are two thin ſharp tranſverſe apophyſes, which form the ſuperior orbitary fiſſures, called *the little wings of the ſphenoidal bone*; a little proceſs, in ſome ſubjects, between theſe two thin apophyſes, for the articulation with the os ethmoides, which in ſome other ſubjects is a notch. Four clynoide apophyſes, two anterior, two poſterior; which laſt are ſometimes united in one, and ſometimes run forward all the way to the anterior proceſſes, forming a kind of bridge, under which the internal carotid artery paſſes at its laſt curvature. This paſſage has alſo ſometimes been found divided into two by a thin bony ſeptum, beſide other varieties; one or two ſmall productions where the internal carotid enters the cranium; two little ſtyloide proceſſes, or hooks, which in ſome ſubjects join the extremity of the os occipitis, before the perfect union of theſe bones.

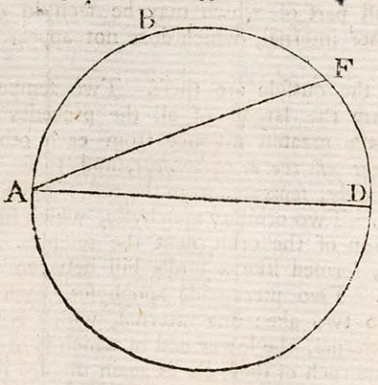
The internal cavities are two portions of the large middle foſſæ of the baſis cranii; two ſuperior, orbitary or *ſphenoidal* proceſſes; two optic holes; a ſmall ſuperior, orbitary hole, near the end of each *ſphenoidal* fiſſure, which is often no more than a notch; a ſmall groove at the extremities of the ſame fiſſures; a depreſſion between the clynoide apophyſes, called *ſella ſphenoidalis*, *ſella turcica*, and *foſſa pituitaria*. Here are alſo ſeen almoſt all the holes mentioned on its outſide, and it appears that the ſuperior maxillary hole ought more juſtly to be called a ſhort canal. Beſide theſe, there are alſo two very conſiderable cavities, called the *ſphenoidal ſinuſes*, ſituated in the thick portion of this bone, under the anterior part of the ſella turcica, and middle ſpace between the two optic holes, reaching as far as the ſharp proceſs, or bill, already deſcribed; theſe are commonly divided by a bony ſeptum, and they open before on each ſide of the ſharp

proceſs, juſt behind the ſuperior conchæ of the noſe, or oſſa convoluta ſuperiora.

The figure, ſize, openings, and ſeptum of theſe vary greatly; ſometimes one is wanting, ſometimes both are ſo; ſometimes there are ſeveral cells without any ſeptum, and ſometimes the ſeptum is placed more on one ſide than the other. The ſubſtance of this bone is for the moſt part compact, having very little diploe; and what there is of this lies in diſtinct parts of the bone, *viz.* in the thick portion behind the ſella turcica, toward the ſymphyſis with the occipital bone, and in the orbitary apophyſes in a ſmall quantity. It is articulated with all the other bones of the cranium, with the oſſa malarum, oſſa maxillaria, oſſa palati and vomer. *Winſlow*'s Anatomy, p. 26.

SPHERE (*Cycl.*)—A *ſphere* is equal to four times the cone, the baſe of which is equal to the generating circle, and the height of which is equal to the radius. Or a hemiſphere is equal to twice the cone of the ſame baſe and height. And a cylinder, of the ſame height and baſe, being triple of the cone, it follows, that the hemiſphere is two thirds of the cylinder, and conſequently the whole *ſphere* two thirds of the circumſcribing cylinder. *Archim.* de Sph. et Cyl.

The portion of a *ſpherical* ſurface, generated by the revolution of an arch A B F, about the diameter A D of a circle, is equal to the area of a circle deſcribed with a radius equal to the chord A F.



The ſurfaces therefore generated by arches, terminated at A, are as the ſquares of their chords, or as their verſed ſines.

Hence parallel planes, which divide the diameter of a *ſphere* into equal parts, divide the ſurface of the *ſphere* into equal parts at the ſame time. *Archim.* de Sph. et Cyl.

SPHERICAL (*Cycl.*)—SPHERICAL *numbers*. See CIRCULAR *numbers*, *Cycl.*

SPHEROID (*Cycl.*)—Dr. Halley has demonſtrated, that in a ſphere Mercator's nautical meridian line is a ſcale of logarithmic tangents of the half complements of the latitudes[b]. But as the earth has been found to be a *ſpheroid*, this figure will make ſome alteration in the numbers reſulting from Dr. Halley's theorem. Mr. Mac Laurin has therefore given us a rule, whereby the meridional parts to any *ſpheroid* may be found with the ſame exactneſs as in a ſphere. We have alſo an ingenious treatiſe of Mr. Murdoch's on the ſame ſubject.—[b See Phil. Tranſ. N° 219. Mr. Cotes has alſo demonſtrated the ſame propoſition, Harm. Menſ. p. 20, 21.] A ſphere, whoſe diameter is equal to the great axis of a *ſpheroid*, is to that *ſpheroid* in the duplicate ratio of the axis to its conjugate. Hence the *ſpheroid* is quadruple of a cone, the height of which is the ſemi-axis, and the baſe of which is equal to a circle deſcribed upon the conjugate axis as its diameter. *Mac Laurin*'s Fluxions Introd. p. 16.

SPHINCTER (*Cycl.*)—SPHINCTER *cutanea*, in anatomy, a name given by Laurence, and ſome others, to the muſcle of the anus, called by Albinus and Winſlow *ſphincter internus ani*.

SPHINCTER *inteſtinalis*. See INTESTINALIS *ſphincter*.

SPHINCTER *labiorum*, in anatomy, a name given by Douglas, and ſome others, to the muſcle of the mouth, called by Riolanus and Albinus *orbicularis*, and *orbicularis oris*, and by Cowper *conſtrictor labiorum*.

SPHINCTER *palpebrarum*, in anatomy, a name given by Molinet, and ſome others, to the muſcle of the eyelids, called by Winſlow and Albinus the *orbicularis palpebrarum*, and *orbicularis*. See the article ORBICULARIS.

SPHINX, (*Cycl.*) in the hiſtory of inſects, a name given by Mr. Reaumur to a very ſingular ſpecies of caterpillar deſcribed in the ſecond volume of his hiſtory of inſects.

The reaſon of the author's having given it that name, is, that when it is not eating it erects its head, and with it more than a third part of its body, into a perpendicular ſituation upon the leaf on which it was before laid all along; it keeps itſelf a long time in this ſituation, looking around it with a ſeeming air of fierceneſs. There are alſo a ſeries of broad belts upon the body, which contribute ſomething towards its reſemblance to the figure of that imaginary monſter.

This caterpillar has a horn on the hinder part of its body, which ſeems to be of no ſort of uſe, but merely a trouble to the creature. It is hollow, and encloſes, in the manner of a ſheath, the new horn which is to appear when the creature changes its ſkin. This the author found to be the caſe by cutting it ſeveral times, and always finding within it the new horn cut off alſo at the ſame place, and had often obſerved the great difficulty the animal had in changing its ſkin, when it came to the horn. *Reaumur*, Hiſt. Inſect. Tom. 2.

SPHONDYLIUM, *cow-parſnep*, in botany, the name of a genus of plants, the characters of which are theſe. The flowers are diſpoſed in umbels, and are of the roſaceous kind, being compoſed of ſeveral petals of a heart-faſhioned ſhape, irregular in ſize, and diſpoſed in a circular order round a cup, which afterwards becomes a fruit, compoſed of two large, flat, oval ſeeds, ſtriated, and uſually marginated at the end, and which frequently depoſit their covering, and are marked with black ſpots on the ſides where they touch one another.

The ſpecies of *ſphondylium*, enumerated by Mr. Tournefort, are theſe. 1. The common hairy *ſphondylium*. 2. The hairy *ſphondylium* with purple flowers. 3. The great *ſphondylium*, called by authors *panax Heracleum*, or Hercules's all-heal. 4. The curled-leaved *ſphondylium*. 5. The hairy *ſphondylium* with narrower leaves. 6. The narrow-leaved *ſphondylium* with blackiſh purple flowers. 7. The little Alpine *ſphondylium*. 8. The ſmooth Alpine *ſphondylium*. *Tourn.* Inſt. p. 319.

The common *cow-parſnep*, which is frequent in our meadows and paſtures, and flowers in July and Auguſt, is recommended by Dr. Willis, and many others, as one of the beſt nervous ſimples our nation produces, and it is pity that it is not brought more into practice. The ſeed is the part in which its virtues are contained in greateſt perfection, and is a very good medicine in hyſteric caſes, given in powder or infuſion.

SPHONDYLUS, in ichthyology, a name given by Pliny, and others of the old authors, to a peculiar ſpecies of the ſyngnathus, or *acus Ariſtotelis*. It is the ſpecies, called by Artedi *ſyngnathus corpore medio hexagono cauda pinnata*; and by other authors the *acus ſecunda ſpecies*; and by Bellonius and Geſner *typhle marina*. *Pliny*, lib. 32. cap. 11.

SPHONDYLUS is alſo uſed by ſome authors, for the ſtones or bones found in the head of a mullet.

SPHRAGIS, the ſeal-ſtone, a name given by ſome authors to the ſingle joints of the aſteriæ, when found looſe, not joined into a column. See the article ASTERIA.

SPHRAGIS is alſo uſed by ſome of the old Greek naturaliſts, to expreſs the ſpots on the back and ſides of a panther.

The ſkin of this creature is of a pale colour, and theſe ſpots are all dark and round, and look like ſo many regular impreſſions of a ſeal, whence the name *ſphragis*. The Romans called any thing, that was variegated in this manner, *pantherina*; and we meet with the phraſe *menſæ pantherinæ*, uſed to expreſs tables found of ſome wood, which was variegated with round ſpots, in the manner of thoſe *ſphrages* on the back of the panther.

SPHYGMICA, in medicine, a term uſed by ſome for that part of the judgment of the phyſician, which regards the differences of the pulſe.

SPHYRÆNA, in zoology, a name by which ſome authors have called the *ſudis*, or *lucius marinus*, the ſea-pike. *Willughby*, Hiſt. Piſc. p. 273. See the article SUDIS.

SPHYRÆNA *altera*, in ichthyology, a name given by Appian, and ſome other of the old Greek writers, to the *eſox*, or common pike. See the articles ESOX and LUCIUS.

SPICCATO, in the Italian muſic, ſignifies that every note ſhould be well ſeparated from others, and diſtinctly ſounded. It is particularly uſed with regard to inſtruments played with a bow; and denotes that every note muſt have a diſtinct bow from that preceding, or ſucceeding.

SPICULUM, in Roman antiquity, a kind of weapon which ſome will have to be the ſame with the haſta, or ſparus. *Hofm.* Lex. in voc.

SPIDER, *araneus*, in zoology, an inſect of which we have a great number of ſpecies common among us, which all agree in the general marks and characters.

They all have weapons iſſuing out of the mouth, but theſe are of two kinds, according to the two principal diſtinctions of the *ſpiders*. They conſiſt, in ſome, of two ſpiculæ, in the manner of a forked hook: this is their ſtructure in all the kinds which have eight eyes. In others they are compoſed of two forcipated arms, or are divided into two claws, in the manner of the legs of a crab: theſe are the weapons of all thoſe *ſpiders* which have only two eyes.

The bodies of all *ſpiders* are covered with a ſort of cruſtaceous coat, but it is tender and brittle; and in the males of all the ſpecies, the forceps, or weapons at the mouth, are larger and ſtronger than in the females.

All *ſpiders* have two antennæ, placed in the forepart of the head over the mouth: theſe are compoſed like the legs of a number of joints. The head of a *ſpider* is not ſeparated from the ſhoulders by any inciſure, but remains fixed to them as all of one piece.

The eyes of the *ſpider* differ greatly in number, ſituation and figure, in the different ſpecies; and ſometimes the different eyes of the ſame *ſpider* are of different ſizes.

All *ſpiders* have eight legs, which are all inſerted into the breaſt, but in the length and figure of theſe there is as much variety as in the eyes in the different ſpecies of

they have all three joints in each leg, but in ſome the foremoſt pair are the longeſt, in others the hinder pair are ſo, and in others ſome of the intermediate pairs.

The belly of the *ſpider* is remarkably divided from the head and ſhoulders, ſo as to adhere only by a thread: this is the caſe in all, except the two-eyed kinds, and in the different ſpecies the body is variouſly painted. The appendages near the anus are very obſervable, they ſerve to ſpin the threads out at. Among the many ſpecies of theſe inſects, ſome are ſmooth, others are hairy, and ſome have a harder, ſome a tenderer ſkin. *Ray*'s Hiſt. Inſect. p. 12.

Among the great number of ſpecies of this inſect, theſe are the principal diſtinctions among thoſe which have eight eyes. Some ſpin webs for the catching of flies of a rounded figure; theſe have all their eyes of the ſame ſize and figure; they have four middle ones placed in a quadrangular figure, and the other four beſide theſe, but ſtanding ſomewhat obliquely. The firſt pair of legs of theſe *ſpiders* are always the longeſt, the ſecond pair are the longeſt next to theſe, then the fourth pair, the third being much the ſhorteſt of all. Theſe *ſpiders* are always ſmooth, or nearly ſo, and are elegantly figured on the buttocks. Of theſe ſome always live in the center of the web, others have their habitation in a neighbouring corner. Of the firſt of theſe ſorts we have five ſpecies. 1. The yellowiſh *ſpider* with white back and ſides, and a white head with large pellucid black eyes. This is of a middle ſize, and its legs are variegated with brown and white. The males in this ſpecies are ſlenderer than the females, and of a more reddiſh colour; and in both ſexes the head and ſhoulders are ſomewhat pellucid. 2. The hazel *ſpider* with a croſs on its back, and tubercles on the belly. This ſpecies ſpins very large nets. 3. The ſlender green and gold ſpider with a long body. This is of a middle ſize, and its fore-legs are extremely long. 4. The grey wood-*ſpider* with the body terminating in a three-cornered point. This is a ſmall ſpecies, but it ſpins very large webs. Its belly is black.

Of the ſecond kind of *ſpiders*, which ſpin round webs, and have their habitation at a corner of the web, not in its center, there are five principal ſpecies. Theſe are, 1. the grey full-bodied *ſpider* with various delineations on the back. This is a very large kind; its ſhoulders are hoary, its legs thick, not long and ſpotted. 2. The ſmooth black croſs *ſpider* with an oval body. This is of a middle ſize, its legs are ſhort and ſpotted. It is very common among ruſhes and water plants. 3. The yellow *ſpider* with four great white ſpots, and many ſmall ones. This is one of the largeſt *ſpiders*, and generally builds its habitation on the tops of plants. This is called by Mouffet, and ſome others, the *Colcheſter ſpider:* and there are two other ſpecies which much reſemble it; the one diſtinguiſhed by having a cheſnut-coloured head, and a black belly; the other, by a large brown ſtreak running from the ſhoulders to the tail. 4. The black *ſpider* with figures like oak leaves upon its buttocks. It is a very large *ſpider*. 5. The grey round-headed *ſpider* with foliaceous lines on the buttocks, undulated at the edges. This is a middle-ſized one, and is common about houſes. *Ray*'s Hiſt. Inſect. p. 24.

Another genus of *ſpiders* are diſtinguiſhed by their building conglobated webs; theſe are all ſmall, and have the fore-legs longeſt of all, next theſe the hinder pair, and then the ſecond, the third being the ſmalleſt of all.

Of theſe there are ſix principal kinds. 1. The black ſmooth houſe-*ſpider*. This is the largeſt of this genus, and has elevated ſhoulders. 2. The white *ſpider* with an oval body, ſurrounded with a ſcarlet ring. 3. The brown *ſpider* with a round body, ornamented with foliaceous figures. 4. The reddiſh brown wood-*ſpider* with a round body, marked with the figure of a ſtar. 5. The ſmall grey *ſpider* with a black ſpot upon its buttocks. And 6. the ſmall livid *ſpider* with denticulated figures on the rump. This uſually erects its conglobated nets on the top of the branches of furze buſhes.

A third genus of *ſpiders* are diſtinguiſhed by the thickneſs and cloſeneſs of the webs; ſome of theſe inhabit the bottom, or funnel-end of their webs, others live near them, but not in them. Of the firſt genus there are two remarkable ſpecies. 1. The yellowiſh hairy long-legged houſe-*ſpider*. This is of a middle ſize, and its eyes are very black and ſparkling. 2. The great grey *ſpider* with the appendices of the anus very remarkably prominent. This is a very large kind, and is of a livid colour.

Of the ſecond kind of theſe, which live at a diſtance from their webs, there are alſo two principal kinds. 1. The ſmooth cheſnut-coloured, or blackiſh *ſpider* with elegant ſnow-white ſpots. This is of a middle ſize, and has long and ſlender legs. 2. The black *ſpider* with white ſhoulders, and a denticulated white mark upon the back. This is of the middle ſize. Its legs are hairy.

To theſe is to be added the cave-*ſpider* of Mouffet. This is a large black *ſpider* with a very large ſpot, of a deeper and more ſhining black upon the ſhoulders.

A fourth genus of *ſpiders*, is diſtinguiſhed by the ſmallneſs of the webs they build: theſe are, however, of a very cloſe texture, and the creature always lives within them. Of the *ſpiders* of this kind there are three principal ſpecies. 1. The grey woolly *ſpider* with a broad black ſpot on the belly. 2. The plain livid, or yellowiſh *ſpider*. This is ſometimes of the one, and ſometimes of the other of theſe colours, but never has any variegations. 3. The yellowiſh cylindric-bodied *ſpider*. This is a large *ſpider*, and has ſix eyes. This has a long ſeries, or chain of ſpots on the back, and a yellowiſh line or ſtreak on each ſide. *Ray*'s Hiſt. Inſect. p. 30. See the articles LUPUS and PHALANGIUM.

The *ſpider* affords to the ſagacious obſerver, as well without as with the aſſiſtance of glaſſes, a great many extremely curious particulars. As the fly (which is the *ſpider*'s natural prey) is an animal extremely cautious and nimble, and uſually comes from above, it was neceſſary the *ſpider* ſhould be furniſhed with a quick ſight, and an ability of looking upwards, forwards, and ſideways, at the ſame time; and the microſcope ſhews, that the number, ſtructure, and diſpoſition of its eyes, are wonderfully adapted to the ſerving all theſe purpoſes.

Moſt *ſpiders* have eight eyes: two on the top of the head or body, for there is no diviſion between them, the *ſpider* having no neck; theſe look directly upwards: there are two more in front, placed a little below theſe, and diſcovering all that paſſes forwards, and on each ſide: a couple more, one whereof points ſideways forward, and the other ſideways backward; ſo that it can ſee almoſt quite round it. All kinds of *ſpiders* have not, however, this exact proviſion; for in ſome we find ten, and in others only ſix, or four. The eyes of the *ſpider* are not pearled; and the field-*ſpiders*, or long-legs, have no more than two eyes.

Whatever be the number of the *ſpider*'s eyes, they are however all immoveable and tranſparent, and are ſituated in a moſt curious manner. The beſt way of viewing them with the microſcope, is to cut off the legs and tail, and leave only the head for examination.

All *ſpiders* have eight legs, which they employ in walking, and two ſhorter, called *arms*, which they uſe in ſeizing their prey. All the legs are thickly beſet with hairs; each has ſix joints, and ends with two hooked claws, which are ſerrated on their inſide; by means of theſe teeth, or jags in their claws, they ſeize very faſt hold of any thing, and behind theſe there is a ſort of ſpur, which is perfectly ſmooth. Beſide theſe, nature has allotted to this creature, for the ſeizing its prey, a pair of ſharp crooked claws, or forceps, in the forepart of its head. Theſe ſtand horizontally, and when not exerted for uſe, are concealed in two caſes contrived for their reception, in which they fold like a claſp-knife, and there lie between two rows of teeth, which are likewiſe employed to hold faſt the prey.

Each of theſe claws, or pincers, has a ſmall ſlit near its point, according to Lewenhoek, like that in a viper's tooth, through which he ſuppoſes that a poiſonous juice is, in like manner, thrown out. But Dr. Mead, in his Eſſay on Poiſons, diſſents wholly from this opinion, having never been able, on repeated examinations, to diſcover any ſuch opening, not even in the claws of the great American *ſpider*; which being above fifty times bigger than any of the European *ſpiders*, would more eaſily have diſcovered this opening, if nature had allotted any to this part of the animal. Beſides, repeated obſervations alſo convinced him that nothing dropped out of the claws, which were always dry, while the *ſpider* bit any thing, but that a ſhort white proboſcis was, at the ſame inſtant, thruſt out of the mouth, which inſtilled a liquor into the wound. And the ſame author obſerves, that the quantity of liquor, emitted by our common *ſpiders* when they kill their prey, is viſibly ſo great, and the wounding weapons ſo minute, that they could contain but a very inconſiderable portion thereof, if it were to be diſcharged that way. *Baker*'s Microſcope, p. 196.

Spiders frequently caſt their ſkins, which may be found in their webs perfectly dry and tranſparent; and from ſuch ſkins the forceps, or claws, for they are always ſhed with the ſkins, may eaſier be ſeparated, and examined with much greater exactneſs, than in the common *ſpider* while living.

The *ſpider*'s manner of weaving its web is very wonderful. The creature has five little teats, or nipples, near the extremity of the tail; from theſe there proceeds a gummy liquor, which adheres to every thing it is preſſed againſt, and being drawn out, hardens inſtantly in the air, and becomes a ſtring, or thread, ſtrong enough to bear five or ſix times the weight of the *ſpider*'s body. This thread is compoſed of ſeveral finer ones, which are drawn out ſeparately, but unite together at two or three hairs breadth diſtance from the creature's body. Theſe threads are finer or coarſer, according to the bigneſs of the *ſpider* that ſpins them. Mr. Lewenhoek has computed, that a hundred of the ſingle threads of a full grown *ſpider* are not equal to the diameter of the hair of his beard; and conſequently, if the threads and hair be both round, ten thouſand ſuch threads are not bigger than ſuch a hair. He calculates farther, that when young *ſpiders* firſt begin to ſpin, four hundred of them are not larger than one which is of a full growth; allowing

which, four millions of a young *ſpider*'s threads are not ſo big as the ſingle hair of a man's beard.

The eggs of ſome *ſpiders* are a very pleaſing microſcopic object; they are round at one end, and flattiſh at the other, with a depreſſion in the center of the flattiſh end, and a yellowiſh circle round it. The colour of theſe eggs is a pearly or bluiſh white, and when the young *ſpiders* hatch, they come out in their perfect form, and run about very nimbly. The female *ſpider* depoſits her eggs, to the number of five or ſix hundred, in a bag compoſed of her own web, which ſhe either carries under her belly, or hides in ſome very ſafe receſs. Philoſ. Tranſ. N° 272.

The young *ſpiders* are always very beautiful objects for the microſcope. The current of the blood may be eaſily diſcovered in their legs, and part of their bodies; and many other curious particulars occur in their diſſection.

There are two or three ſpecies of this animal, peculiarly worthy the attention of the curious in microſcopic diſcoveries. 1. A little white field-*ſpider* with ſhort legs. This is found plentifully among new hay, and its body appears like white amber with black knobs, out of which grow ſhort but ſharp prickles. The eyes of theſe may be very diſtinctly ſeen, being very briſk and lively, and ſome have ſix, ſome eight of them: each eye has a pupil of a violet blue, which is beautifully clear and tranſparent, and is ſurrounded by a circle of pale yellow. 2. The wandering, or hunting *ſpider*, that ſpins no webs, but runs and leaps by fits. This has two tufts of feathers fixed to its fore-paws, which make a very beautiful appearance before the microſcope. The variety and beauty of colouring alſo, all over this little creature, afford a very pleaſing ſight. 3. The *long-legs*, or ſhepherd-*ſpider*. This is a moſt wonderful creature: it has two fore-claws at a great diſtance from the head, tipped with black like thoſe of a crab, and opening and ſhutting like the ſcorpions; theſe are ſerrated or indented on their inſide. When all the legs are cut from this *ſpider*, and it is examined by the microſcope, it will be ſeen that the protuberance on the top of its back is furniſhed with two fine black eyes. *Power*'s Microſ. Obſ. p. 13. *Hook*'s Microgr. p. 200.

The venom of many kind of *ſpiders* is greater than uſually ſuppoſed: we have, in the Philoſophical Tranſactions, an account of a perſon in New-England who was bitten by a ſmall *ſpider* a little above his ankle; he perceived the creature biting, and cruſhed it to death upon the wound, between his ſtocking and his leg; in half an hour he felt a pain in that leg, which in another half hour extended itſelf to the groin, and at the ſame time he had a creeping pain in the calf of his other leg; and in a quarter of an hour after this it affected his ſtomach, his back, and his head. The pains were not conſtant and fixed, but erratic, and very acute, and his pulſe was extremely low and heavy. He was relieved, by taking internally ſpirit and ſalt of hartſhorn in viper-wine, and applying a cataplaſm of garlick to the part, and in three or four days wholly recovered.

Boccone mentions a ſpecies of large *ſpider*, common in the iſland of Sardinia, whoſe bite proves mortal within the ſpace of a few hours; the whole body uſually ſwells almoſt immediately, in conſequence of this bite. The cure is performed by oil of olives, in which the creature is infuſed over the heat of a ſtove. This is a medicine they always keep ready in the houſe, and while they uſe this externally, they give large doſes of Venice-treacle inwardly, diſſolved in ſtrong wine: but many die of this bite, either from the want of power in the remedies, or from their being uſed too late. *Boccon.* Muſ. de Fiſ.

When *ſpiders* aſcend and deſcend by their thread, they do not ſpin a new one at every deſcent; but whenever they aſcend, they wind the thread with their feet into a ſort of coil, and when they deſcend, they only unravel it again. Phil. Tranſ. N° 482. ſect. 16.

Some think the white matter, we often find floating in the a irtowards the end of the ſummer, is produced by *ſpiders*. Ibid. See the articles *Air*-THREADS, OPILIO, PHALANGIUM, *&c.*

SPIDER-*wort*, in botany. See PHALANGIUM.

SPIEI, 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 to work. *Neri*'s Art of Glaſs, p. 241.

SPIGNEL, in the materia medica, *&c.* the Engliſh name of the plant called by botaniſts *meum*. See MEUM.

SPIGOLA, in ichthyology, a name given by Paulus Jovius, and ſome others, to that ſpecies of pearch which is generally called the *lupus marinus*. See the article LUPUS.

It is a genuine pearch, and is diſtinguiſhed from the others by Artedi, by the name of the *pearch* with the thirteen rays in the ſecond back fin, and fourteen in the pinna ani. Authors have called two different fiſh by this name *lupus marinus*, which conveying no diſtinct idea of the characters of the fiſh, was applicable to either as much as the other; but this name of Artedi admits of no equivocation, and muſt always diſtinguiſh the fiſh.

SPIKE, or *Oil of* SPIKE, a name given by our druggiſts to an eſſential oil, much uſed by the varniſh-makers and the painters in enamel; and of ſome uſe in medicine.

This *oil*, when genuine, is brought from Provence, and ſome other parts of France, and is there made of lavender. This plant is called in Provence *aſpic*, and thence came the name *oil of aſpic*, which afterwards degenerated into *oil of ſpike*.

The manner of making the *oil* upon the ſpot is this: when the flowers are perfectly ripe, they put them into an alembic with a great quantity of water, and this they diſtil after ſeveral days maceration: there ariſes with the water a large quantity of an oil of a fine pale amber colour, and this ſeparated from the water, is the true and genuine *oil of ſpike*.

The flower of this plant is the part which yields the largeſt quantity of oil; as is the caſe with all the plants with galeated flowers, of which the huſk or flower-cup uſually contains almoſt all the oil of the plant. The aromatic plants, in general, yield indeed but a ſmall quantity of oil, but the vaſt abundance of this plant, in theſe places, makes the expence of gathering it ſo ſmall, that the *oil* is very cheap. The quantity required on ſeveral occaſions is, however, much greater than what all the lavender of the country can yield; and the price it is expected to be ſold at is ſo ſmall, that it is not to be wondered that there are ſeveral common adulterations of it.

The moſt uſual ways of ſophiſticating it, however, are two; the one with the ſpirit of wine, which is eſteemed the leaſt hurtful, and the *oil* thus ſophiſticated is often called the very beſt of the country. The method Mr. Geoffroy took to diſcover the cheat was this: he procured a long and narrow vial, of an equal diameter all the way up, into this he firſt put an ounce of fair water, and to this he added an ounce of the *oil*; he marked the height of the water in the vial, then ſhook the two liquors together, and they became milky, and heated on the mixture, which alone would have been a ſufficient proof that there was ſpirit of wine in the *oil*. After ſome ſtanding the liquor became clear, and the *oil* floated at the top, but in a much ſmaller quantity than might have been expected, there being not more than a quarter of an ounce of it, the reſt having been ſpirit of wine, which mixed with the water, and thus left all the true *oil*, which was only one fourth of the quantity, to float alone on the water, which was greatly encreaſed in height in the vial. A pint of this *oil of ſpike*, therefore, contains only four ounces of the genuine *oil*, and twelve ounces of plain ſpirit of wine.

The ſecond method of adulterating this *oil*, which the ſame gentleman had ſuſpected, was eaſily diſcovered next: for on mixing this quarter of an ounce of pure *oil of ſpike* with three quarters of an ounce of oil of turpentine, there was produced an ounce of a liquor, which appeared wholly the ſame with the *oil of ſpike* commonly ſold in the druggiſts ſhops. And indeed, much of what is uſually ſold is worſe than this, being no other than oil of turpentine ſcented with a ſmall quantity of the true *oil of ſpike*.

The ready way of diſcovering the *oil*, counterfeited with oil of turpentine, is to wet a paper in it, and ſet it on fire; the turpentine will here be diſcovered by the thick ſmoak it yields, it being, of all vegetable oils, that which yields greatly the thickeſt cloud in burning: and, on the contrary, that which has been adulterated with ſpirit of wine, will be diſtinguiſhed by the ſame trial, by its yielding a much finer and thinner ſmoak, and burning with a bright blue flame. If they be tried by firing them in a ſpoon, that which is adulterated with ſpirit of wine will burn very bright, and yield no fume at firſt; but as it grows near the bottom, it will ſmoak a little, and finally will leave no reſiduum, except that it varniſhes over the inſide of the ſpoon: that adulterated with the oil of turpentine will burn more vehemently, ſmoak more, and leave a coarſer varniſh upon the ſpoon; and if it be of the coarſeſt kind, that is, if it have been adulterated with badly-rectified oil of turpentine, the fume will be the more abundant, and there will be left in the ſpoon a fetid matter, reſembling melted pitch.

Mr. Geoffroy tried whether, in the buſineſs of varniſhing, the oil of turpentine alone might not do as well as the *oil of ſpike*; he found that it dried perfectly well, but that it left a ſtinking ſmell upon the work, which never went off; whereas the mixture of this oil, with that of *ſpike*, makes a ſmell like neither, and which ſoon goes off.

An ounce of oil of turpentine, with only twenty drops, either of our common oil of lavender, or the pure *oil of ſpike*, makes a liquor tolerably well ſcented, and which ſerves for the purpoſes of *oil of ſpike*. If two drachms of our oil of lavender be added to ſix drachms of ſpirit of wine, they immediately mix, and this afterwards mixed in a ſmall proportion with oil of turpentine, makes a ſort of *oil of ſpike*. The moſt regular method, however, that the artificer can uſe, if he can get the genuine *oil of ſpike*, is to mix one ounce of it with three of oil of turpentine, which perfectly fits it for his purpoſe, and makes it the ſame with that in common uſe. The method of making this perfectly pure, is to rediſtil it in a balneum mariæ; there will thus be procured

cured an oil highly rectified, and pellucid as water, which will dry away as ſoon as touched on any thing. The great diſadvantage attending the *oil of ſpike* adulterated with ſpirit of wine, is, that it will not readily mix with all the ſorts of varniſh.

Having gone through the properties of *oil of ſpike*, in regard to varniſh, it remains to enquire into them in regard to its other great uſe in enamel, and to conſider the effects of the two uſual methods of adulterating it in this work.

The *oil of ſpike* which wants body, is not at all fit for enamelling, becauſe it dries too ſuddenly, and does not at all aſſiſt the natural dryneſs of the enamel, which is only a ſort of powder of glaſs; and the particles of this powder, with a fluid of too little body, are not manageable by the artiſts, ſo that the colour never is brought to a due conſiſtence: and when the *oil* has too much body, the mixture becomes too tenacious, and is as unmanageable in that extreme as in the other; and this fault is attended with another very great miſchief, which is, that the ſume raiſed by this *oil*, when heated, is often ſo groſs, as to deſtroy the beauty of the colours. In ſhort, thick oil of turpentine is always deſtructive of enamels by its ſmoak.

The true compoſition for enamelling is *oil of ſpike* mixed with ſpirit of wine, but the proportions muſt be nicely regulated from repeated trials: for if the quantity of the ſpirit be too large, it is apt to ſeparate itſelf from the *oil* and colour in the drying, and this always ſpoils the gloſs and beauty of the work. Artificers obſerve, that *oil of ſpike* does beſt for their purpoſes, after it has been kept two or three years. But this is only owing to the *oil*'s being adulterated with ſpirit of wine, and uſually containing too large a proportion of the ſpirit when firſt ſent over, it becomes better for uſe when a part of that ſpirit has had time to evaporate in the keeping. It would be a better way for theſe curious works, to procure the *oil* pure, and then occaſionally mix it with ſuch a proportion of ſpirit of wine, as experience ſhews to be the moſt proper. Mem. Acad. Par. 1716.

SPIKENARD, in botany. See the article NARDUS.

Ointment of SPIKENARD. See NARDINUM *unguentum.*

SPIKES, or, as the ſeamen call them, SPEEKS, in a ſhip, are large long iron nails with flat heads. They are of divers lengths, ſome a foot, or two long, and ſome are jagged, ſo that they cannot be drawn out again. They are uſed to faſten the planks and timbers. They call alſo a kind of ſmall fidd, which ſerves them to open and ſplice ſmall ropes, a *marling ſpike.*

SPINA (*Cycl.*)—SPINA *bifida*, in anatomy, a parting of the *ſpinal* proceſſes into two rows. The exiſtence of ſuch a caſe is doubted. See SPINE.

SPINA *burgi*, in botany, a name uſed by ſome authors for the *alaternus*, or ever-green privet, a garden ſhrub, the fruit of which is a mild aſtringent. *Park.* Theatr. p. 1445.

SPINA *ventoſa*, is properly a ſpecies of corruption of the bones, which takes its riſe in their internal parts, and by degrees enlarges the bone, and raiſes it into a tumor.

The antients were ſtrangers to this name for this diſorder, and called it *ſideratio*, *gangræna*, or *cancer oſſis*, and ſometimes expreſſed it by the word *teredo.* Some among the French call it alſo an *exoſtoſis*, though this is a term more properly denoting certain eminences, or preternatural acuminated excreſcences in the bones, which happen after fracture, or other accident, and are ſome.imes attended with a caries.

The name of the diſorder ſeems to have been borrowed from *ſpina*, a thorn, from the reſemblance the eminences of the bone in this caſe bear to thorns, continually pricking the fleſh, and producing the moſt grievous pains; and the epithet *ventoſa* is added, becauſe the tumor ſeems, to the touch, to be filled with air, though this is very rarely the caſe. This ſeems to have been the origin of the name *ſpina ventoſa*, which ſome after-writers barbarouſly diſtorted into *ſpinæ ventoſitas.* When this diſorder happens to children, Severinus, and many others, call it *pædarthrocaces.*

In the *ſpina ventoſa* the caries, or eroſion of the bone, is occaſioned by a depravity of the contained fluids, and generally ariſes ſpontaneouſly, or without any external cauſe, and does not begin upon the ſurface of the bone, but between its lamellæ, or elſe in its internal cavity; from whence extending itſelf by degrees to the external parts, it at length either affects the whole bone, or a greater or ſmaller part of it, expanding itſelf to different widths, and riſing to a tumor, which is ſometimes hard, and without pain, and at others feels as if it were filled with wind, and is attended with a greater or leſſer degree of pain, pricking and ſhooting, and at laſt grows red, and is attended 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 entire, but at laſt partaking of the diſorder, foul ulcers of a very terrible ſort break out. When tumors of the bone are hard, and the ſoft parts about them not inflated, and are 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 tumors happening equally to children, and to adults, are properly the *ſpina ventoſa.*

It differs from a caries by being attended with a tumor, and from the rickets by its being accompanied with pain and eroſion. It generally begins about the heads, or epiphyſes of the larger bones, where they are moſt tender and ſpungy, 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. Sometimes, however, it alſo ariſes in the middle of the bones, between their lamellæ, eſpecially in the tibia. The os frontis is alſo ſubject to diſorders of this kind in venereal caſes, and it is frequently ſituated in the bones of the face, neck and breaſt; though thoſe of the arms, legs, fingers, carpus, meta-carpus, tarſus, and meta-tarſus, are more frequently the ſubjects of it.

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, and their fluids extravaſated, and by degrees putrefy, corrupt, and deſtroy the medulla, and ſoften the very ſubſtance of the bone, and corrode it; whence proceed pain, tumors, ulcers, and fiſtulas of the bone, and adjacent parts, and all the ſame train of miſchiefs which attend theſe diſorders, when begun ſpontaneouſly from internal cauſes.

The proximate cauſe of this diſorder is a collection, or congeſtion, either of a viſcid and thick, or of an acrimonious and corroding humor, or an inflammation ariſing in the medulla, or in the cellular ſubſtance of the bone, degenerating into an abſceſs, and forming matter, or ichor. As theſe ſtagnating fluids can find no diſcharge from the bones, eſpecially from their cavities, they continue confined there till they putrefy, and become acrimonious, and corrode and deſtroy the neighbouring parts, converting them, particularly the medulla, into a kind of ſanies; and at length they attack the bone and deſtroy it. The collection of viſcid and pituitous humors, and the expanſion of the bones, ſometimes happens without pain, as in ricketty caſes, 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 perioſteum, 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. But when the tumor is opened, either ſpontaneouſly, or by the knife, the bone, if it lies bare, is found full of ſmall eroſions, reſembling a ſponge or pumice-ſtone.

Of this terrible diſorder there are properly three degrees: the firſt is, when the patient complains of a continual grievous pain in the bone, which ſeems to him to proceed from the marrow, and torments him ſo, that he can have no ſleep, and all this while there is no external pain or tumor; in this caſe the diſeaſe is confined to the internal part of the bone. The ſecond degree is when a tumor appears to be ariſen on the ſurface of the bone, and is attended with external pain, more or leſs. The third degree is when, after the former ſymptoms, an ulcer is formed in the tumor, which 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 milder, the other to the more violent ſtate of it, in which the bones, and the parts ſurrounding them, are entirely corroded and deſtroyed. In the milder ſtages, the acrimony of the blood muſt be endeavoured to be corrected by large draughts of the decoctions of the woods, with the China and ſarſaparilla roots. The parts affected ſhould alſo be fumigated with the ſteam of decoctions of aromatic herbs, and twice a day, in the intermediate times, the part may be rubbed over with a mercurial ointment, and afterwards covered with the common mercurial plaſter. Mercurial medicines ſhould alſo be given internally, according to the ſtrength of the patient, and ſometimes a ſalivation is neceſſary.

Mercurial remedies ſeem indeed ſo peculiarly appropriated to this caſe, that nothing is to be done without them; and it hence looks very ſuſpicious, that ſomething venereal is always in the caſe, or elſe that the diſorder is of itſelf very much akin to that diſeaſe. By diligently purſuing this method for ſome weeks, the firſt and ſecond ſtages of this diſeaſe may be cured even where there are bony tumors formed; and the tumors may either be reduced, or at leaſt brought to that ſtate, that they will remain as they are without farther encreaſe, or without pain, or any farther inconveniency.

But when theſe tumors are ſo far advanced, as to be out of the reach of the remedies, the pain and tumors encreaſing, and abſceſſes forming; as there is great reaſon to fear the

the entire deſtruction of the bone, if the abſceſs does not burſt of itſelf, the ſurgeon ſhould not ſtay for its maturation, but lay the bone bare in the loweſt, or in the moſt painful part. When the abſceſs is already burſt, if the opening be too ſmall, it muſt be enlarged with a knife, or if the patient too much dreads the knife, the cauſtic may ſupply its place; and after this ſeveral ſmall 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: this will not only make more way for the diſcharge of the matter, but will alſo give room for the proper application of remedies better than any other method.

While this is under cure, the patient muſt uſe internally the decoctions 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 agrimony, ſanicle, St. John's wort, or birthwort, and eſſence of myrrh and aloes. Theſe ſhould be injected warm with a ſyringe twice every day, as may alſo a ſolution of mercurius dulcis made in plantane-water, or in 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 before-mentioned 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, for in other caſes there is no getting to the bottom with it.

But when all theſe methods are unſucceſsful, and the part is already too much corroded and deſtroyed, there is no hope of ſaving it, nor indeed of ſaving the life of the patient, by any other means than the taking off the limb. When the diſorder is ſituated, however, in ſome ſmall bone, as on the carpus, tarſus, meta-carpus, or meta-tarſus, or fingers, it will not always be neceſſary to take off the whole limb, that is to ſay, the finger, foot, or hand, but it will frequently ſuffice to remove the corrupted 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 *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 entire joint of the arm, knee, or foot, is diſeaſed, there is no remedy but amputating it in the ſound parts juſt above. *Heiſter*'s Surgery, p. 264.

Dr. Schlichting affirms, that the *ſpina ventoſa* may be cured by rubbing the tumor twice a day with ung. Neapolit. preventing ſalivation by gentle cathartics. Phil. Tranſ. N° 466. ſect. 10.

It appears likewiſe, from a caſe related in the Philoſophical Tranſactions, that amputation of the limb is not always neceſſary. Vid. Phil. Tranſ. N° 480.

SPINACHIA, *ſpinach*, in botany, the name of a genus of plants, the characters of which are theſe. The flowers are of the apetalous kind, conſiſting only of a number of ſtamina. Theſe flowers are alſo barren, and the embryo ſeeds are found on ſuch parts, or different plants of *ſpinach*, as have no flowers. Theſe finally become ſeeds of a turbinated form, and are contained either in a capſule of the ſame figure, or elſe in a cornuted or angular one.

The ſpecies of *ſpinach*, enumerated by Mr. Tournefort, are theſe. 1. The common *ſpinach* with prickly ſeed-veſſels. 2. The common barren *ſpinach*. 3. The procumbent Cretic *ſpinach* with echinated capſules. And 4. the common *ſpinach* with ſmooth capſules. *Tourn.* Inſt. p. 533.

The common *ſpinach*, intended for winter uſe, ſhould be ſown on an open ſpot of ground in the latter end of July, obſerving to do it, if poſſible, when the weather is rainy. When the young plants are come up, the weeds muſt be deſtroyed, and the plants left at about five inches aſunder. The ground being kept clear of weeds, the *ſpinach* will be fit for uſe in October. The way of gathering it to advantage, is only to take off the longeſt leaves, leaving thoſe in the center to grow bigger; and at this rate a bed of *ſpinach* will furniſh the table for the whole winter, till the *ſpinach* ſown in ſpring is become fit for uſe, which is common in April. *Miller*'s Gard. Dict.

SPINACHIA, in zoology, a name given by ſome authors to our common ſtickleback, or barnſtickle, more uſually known among writers by the names *pugnitius*, or *aculeatus piſciculus*. *Geſner*, de Aquatil. See the article PUGNITIUS.

SPINALIS (*Cycl.*)—SPINALIS *cervicis*, in anatomy, a name given by Albinus to a muſcle of the neck, called by Fallopius the *tertium par muſculorum dorſi*, and by Cowper and Morgagni *ſpinalis colli*.

This is the muſcle which the French anatomiſts call *les vertebraux externes du demi-epineux, ou le tranſverſaire epineux du col.* See TRANSVERSALIS, *&c.*

SPINALES *colli minores*, muſcles lying between the ſix *ſpinal* apophyſes of the neck, and between the laſt of the neck and firſt of the back; being inſerted in theſe apophyſes by both extremities on one ſide of the poſterior cervical ligament, which parts them from thoſe of the other ſide. They are likewiſe termed *interſpinales*. Vid. *Winſlow*'s Anat. p. 244.

SPINALIS *dorſi*, in anatomy, a name given by Albinus to a muſcle of the back, figured by Euſtachius Tab. 37. and called by Fallopius *quintiparis dorſi muſculorum pars implantata in ſpinas vertebrarum thoracis*.

Others, as Spigelius, have called it a part of the *ſemiſpinatus*, and others a part of the *longiſſimus dorſi*. The French have named it *le grand epineux de dos*. See the articles SEMISPINATUS and LONGISSIMUS *dorſi*.

SPINALIS *dorſi major*, a pretty long and ſlender muſcle, lying upon the lateral part of the extremities of the *ſpinal* apophyſes of the back. It is compoſed of ſeveral muſcular faſciculi of different lengths, which croſſing each other, are inſerted laterally by ſmall tendons in the *ſpinal* apophyſes from the ſecond, third, or fourth vertebræ of the back; and ſometimes, though ſeldom, from the laſt of the neck, or firſt of the back, all the way to the firſt or ſecond vertebra of the loins, with ſeveral irregular decuſſations, which vary in different ſubjects. The longeſt faſciculi are all a little incurvated, and the whole muſcle terminates in points at its ends, but is conſiderably broad in the middle. It communicates by ſome fibres with the longiſſimus dorſi, and *ſemiſpinalis*, and ſends off faſciculi to ſeveral tranſverſe apophyſes of the back, from the fourth to the eleventh. It is called by ſome *ſemiſpinalis*, but very improperly. *Winſlow*'s Anatomy, p. 247.

SPINALES *dorſi minores*. Theſe muſcles are of two kinds; ſome go laterally from the extremity of one *ſpinal* apophyſis 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 ſmaller and thinner than thoſe of the neck, and are properly enough termed *interſpinales*. *Winſlow*'s Anatomy, p. 248.

SPINALES *et tranſverſales lumborum*. There are ſome faſciculi which run up from the ſuperior falſe *ſpines* of the os ſacrum to the lower *ſpinal* apophyſes of the loins, which may be looked upon as ſo many *ſpinales lumborum majores*; and there are alſo ſome *ſpinales lumborum minores* between the *ſpinal* apophyſes of the loins, and *tranſverſales minores* between the tranſverſe apophyſes, which are ſometimes of a conſiderable breadth. *Winſlow*'s Anatomy, p. 249.

SPINARELLA, in ichthyology, a name given by Bellonius, and ſome other authors, to the little fiſh called by us the *leſſer ſtickleback*, and diſtinguiſhed by Artedi by the name of the *gaſteroſteus* with ten ſpines on the back. See the article GASTEROSTEUS.

The ſize is an uncertain mark, but this number of the ſpines wholly determines the ſpecies, the common *gaſteroſteus*, or ſtickleback, having only three.

SPINATUS, in anatomy, a name given by Riolanus, and others, to a muſcle of the neck, called by Albinus *ſpinalis colli*, and by Winſlow, and the other French writers, *les vertebraux externes du demi-epineux, ou tranſverſaire epineux du col.* See the articles SPINALIS and TRANSVERSALIS.

SPINDLE (*Cycl.*)—SPINDLE, in mining, is a piece of wood faſtened into either ſtow-blade. *Houghton*'s Compleat Miner in the Explan. of the Terms. See the article STOWS.

Theſe ſtows give a miner, or any other perſon that owns them, as good a right to a meer or meers of ground, (ſo that every meer have a pair of ſtows ſet on them) as a deed of conveyance doth to any purchaſer. *Houghton*, ibid.

SPINDLE, in ſhip-building, a part of the capſtan. See the article CAPSTAN, *Cycl.* and *Suppl.*

SPINE (*Cycl.*)—This takes in all that order of bones which follow one another without interruption, from the os occipitis downward along the poſterior part of the trunk.

It repreſents a very compound folding pillar, round on the foreſide, and on the backſide ſtuck full of prickles or points, repreſenting ſo many *ſpines*. It has a canal in the middle through its whole length, into which a great number of holes open on each ſide. When it is viewed directly on the foreſide or backſide, it appears ſtrait, and to be made up of different portions of pyramids, in a contrary ſituation to one another; but viewed ſideways, it preſents ſeveral different curvatures. The pieces which compoſe the *ſpine* are of two kinds, one ſimple, the other compound; the ſingle pieces are generally twenty four in number, called by the name of *vertebræ*; the compound pieces are two, the os ſacrum and os coccygis. The ſingle ſpecies are alſo called *true vertebræ*, to diſtinguiſh them from the portions which compoſe the other two, which are called *falſe vertebræ*. The true vertebræ are divided into three claſſes, *viz.* ſeven of the neck, twelve of the back, and five of the loins; and to theſe are given the names *cervical*, *dorſal*, and *lumbar*. *Winſlow*'s Anatomy, p. 53.

This bone, when felt through the integuments, ſeems ſometimes divided, and has given riſe to the notion of a *ſpina bifida*, or bifurcation of the *ſpine*. But ſome doubt of the exiſtence

exiſtence of ſuch a caſe, as a perfect *ſpina bifida*, ſuppoſes the very canal and *ſpinal* marrow to divide into two branches, and the *ſpinal* proceſſes to divaricate into two rows. We have a caſe in the Philoſophical Tranſactions, where the *ſpinal* marrow of an infant was found bare, without any bony covering, and which was taken for a *ſpina bifida*. See Phil. Tranſ. N° 472. ſect. 2. and N° 366. p. 98.

See, in the Mem. de l'Acad. Royale des Sciences anno 1730, ſome curious obſervations, by Mr. Winſlow, on the motions of the *ſpine*.

Cartilages of the SPINE. The cartilages of all the vertebræ in general are of two kinds, one proper to each vertebra, the other common to two vertebræ which lie next one another; the firſt may be termed the *cartilages of articulation*, the latter the *cartilages of ſymphyſis*.

The proper articular cartilages of each vertebra of the whole *ſpine* are thoſe four which cover the ſurfaces of the four ſmall articular apophyſes. In the natural ſtate they are very white and ſmooth, and much thicker than in the dried bones. Their circumference is the ſame with that of the articulated ſides of the apophyſes, except in thoſe places where there are ſmall ſuperficial notches. The vertebræ of the back, beſide the four cartilages of their ſmall apophyſes, have others which do not belong to their articulations with one another, *viz.* thoſe which cover the lateral foſſulæ in the bodies of theſe vertebræ, and the foſſulæ in their tranſverſe apophyſes, by both of which they are articulated with the ribs.

The cartilages of the ſymphyſis lie between the bodies of the vertebræ, one of them being contained between, and cloſely joined to the lower ſurface of one vertebra, and to the upper ſurface of the next under it; the breadth and circumference of theſe anſwer exactly to thoſe of the ſurfaces between which they are contained, but their height, or thickneſs, is different in each claſs of the vertebræ. In the vertebræ of the loins they are, according to the ſtature of the ſubject, a quarter or a third of an inch thick, in thoſe of the neck they are not ſo thick, and thinneſt of all in thoſe of the back. Neither are they of equal thickneſs in all their parts, thoſe of the neck and loins appear to be thickeſt on the foreſide, and thoſe of the back rather thickeſt on the contrary part; but theſe differences are moſt remarkable in the vertebræ that lie near the middle of each claſs.

The internal ſtructure of theſe cartilages is different from that of all the other cartilages of the body, and indeed they reſemble the reſt in nothing but in whiteneſs and in elaſticity. When we view their circumferences only, they appear to be one uniform maſs like the reſt, but when divided by an inciſion, parallel to the ſurface of the vertebræ, we ſee that they are made up of a great number of concentric cartilaginous rings, contained within each other, with a ſmall ſpace left between them. Theſe are cloſeſt and thinneſt near the center, and about the middle ſeem to degenerate into another ſofter kind of ſubſtance. Theſe rings do not form an entire circumference, being turned inward on the backſide, anſwerably to the poſterior ſlope in the body of each vertebra. They lie horizontally, one edge being fixed to the lower ſide of one vertebra, and the other to the upper ſide of the vertebra next below the former.

The interſtices between the rings are filled with a mucilaginous ſubſtance, leſs fluid than that of the joints, and their breadth, or heighth, is proportionable to the diſtance of the vertebræ between which they lie.

Each cartilaginous lamina taken ſeparately is very pliable, according to its length, but taken all together they are not ſo eaſily bent, partly becauſe of their circular figure, and partly becauſe of their proximity and multiplicity. They yield, however, in the inflexions of the *ſpine*, and without any inflexion to the weight of the head and upper extremities; but this is done by very ſmall degrees, and moſt of all, when the upper part of the body is loaded with any foreign weight. After theſe compreſſions they reſtore themſelves, merely by being freed from the preſſure; ſo that a man is really taller after lying ſome time, than after he has carried a burthen for a great while. Theſe ſingular obſervations of the different heights of the ſame perſon, at different times, which were firſt made in England, and afterwards confirmed at Paris by Mr. Morand, are moſt naturally and eaſily accounted for, merely by the different ſtate of the intervertebral cartilages.

The intervertebral cartilages of the neck lying, for the moſt part, between the convex ſide of one vertebra, and the concave ſide of another, are of a greater extent, in proportion to the ſize of thoſe vertebræ, than thoſe of the back and loins. The os ſacrum has no cartilage, except that between the upper ſide of the firſt falſe vertebra, and the laſt vertebra of the loins; and thoſe by which it is connected to the oſſa innominata, already deſcribed as the cartilages of that bone. The cartilages, which join the different portions of the os coccygis, are preſerved in ſome ſubjects to a very great age, but in others they very ſoon become entirely bony. *Winſlow*'s Anatomy, p. 145.

Ligaments of the SPINE. The vertebræ are ſtrongly connected to each other by three kinds of ligaments. Each vertebra is connected to thoſe above and below it by a great number of very ſhort and ſtrong ligaments, which croſs each other obliquely, and are fixed round the edges of the body of each vertebra. Theſe crucial ligaments cover the circumference of the intervertebral cartilages, and adhere cloſely to them.

The bodies of all the vertebræ, from the ſecond of the neck to the os ſacrum, are covered by ligamentary half vaginæ on the convex ſide, in which theſe vaginæ are fixed, ſurrounding all the crucial ligaments, and made up of ligamentary filaments partly oblique, but for the moſt part longitudinal. All the vertebræ are likewiſe ſtrongly connected by a ligamentary tube, which lines the inner ſurface of the medullary canal from the occipital hole to the os ſacrum; it repreſents a long flexible funnel, its cavity at the upper part being equal to that of the occipital foramen, and ending in a point at the os ſacrum. The firſt vertebra is fixed to the os occipitis beſide this, by a diſtinct and very ſtrong ligamentary covering; the ſecond has two ligaments peculiar to it, one which connects the apophyſis dentiformis to the os occipitis, and another tranſverſe, which confines this apophyſis within the anterior portion of the cavity of the firſt vertebra. The firſt may be called the occipital, and the ſecond the tranſverſe ligament of the odontoide apophyſis. Along the whole bony canal of the *ſpine*, between the baſes of each *ſpinal* apophyſis, lies a flat and very elaſtic ligament, of a yellowiſh colour, which fills up the poſterior great notches of the vertebræ, adhering to their edges, and to the neighbouring portions of the inner ligamentary tube.

Between the extremities, or apices of the *ſpinal* apophyſes, are ſmall ligamentary ropes, which go from one *ſpine* to the next, which are all really double, though they appear ſo only in the neck, being there fixed ſeparately to the forked extremities of the *ſpines*. Between all the *ſpinal* apophyſes, from their apices to the middle of their baſes, lies a ligamentary membrane, going between each two; and there is a ligament of a like kind between the two tranſverſe apophyſes in all.

The articular ligaments of the *ſpina* dorſi are thoſe which tie the glenoide cavities of the firſt vertebra to the condyles of the os occipitis; thoſe that join the cartilaginous ſurface of the apophyſis dentiformis to the anterior cavity of the firſt vertebra, and thoſe by which all the oblique, or articular apophyſes, are connected together. Theſe are all ſmall, ſhort, and ſtrong. The vertebral ligaments of the ribs, or thoſe which connect the ribs to the vertebræ, are of the ſame kind, and are inſerted round the cartilaginous foſſulæ in the body, and apophyſes of each vertebra. Beſide all theſe ligaments of the *ſpine*, there is one which goes in form of a membrane from the os occipitis, all the way to the laſt two vertebræ of the neck: this is a true intermuſcular ligament, and may be properly called the *ligamentum cervicale poſterius*. There are alſo two lateral ligaments of the ſame kind, fixed to the tranſverſe apophyſes of the vertebræ of the neck. *Winſlow*'s Anatomy, p. 147.

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 very different and very ſtrange figures; ſome 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*. Another very common kind in ſome parts of the world, eſpecially in Syria, but leſs frequent with us, is the body called by authors *lapis judaicus*: theſe are ſuppoſed, in ſome ſort, to reſemble an olive, ſwelling from a ſhort ſtalk to a large thick and ſhort body of an oval figure, and marked very elegantly with longitudinal furrows, and in the different ſpecies with very differently ſhaped tubercles. Of this ſhape there are alſo ſome perfectly ſmooth.

We have alſo with us great numbers of a kind approaching to theſe, but having longer ſtalks and ſmaller bodies, and theſe we meet with of all ſizes, from three inches in length down to the bigneſs of a barley-corn; and there are at times found ſome of all the intermediate figures, between theſe tumid ones and the long and ſlender ſort.

We have numbers alſo of various lengths, and variouſly ſurrounded with granulæ of a ſhape nearly cylindric, and beſide the bodies themſelves, we meet with impreſſions of all the kinds on our flints in gravel-pits. 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. *Hill*'s Hiſt. of Foſſ. p. 652.

SPINNING (*Cycl.*)—The art of *ſpinning*, which nature has given to many animals of different kinds for their preſervation and other purpoſes, is not confined to the inhabitants of the earth or air alone, but is even extended to thoſe of the ſea. Mr. Reaumur has ſhewn, by a ſeries of curious experiments, that the common muſcle, and ſome other ſhell-fiſh of the ſea, poſſeſs it in a great degree of perfection. See the article MUSCLE.

But he obſerves, that though the workmanſhip is the ſame, the manner of producing it is very different. Spiders, caterpillars, and the like, make threads of any length that they pleaſe, by making the viſcous liquor, of which they are formed, paſs through a fine perforation in the organ appointed for this *ſpinning*: but the way in which the muſcles form their threads is very different, as the former reſembles the work of the wire-drawer, ſo this does that of the founder, who caſts metals in a mould. The canal of the organ, deſtined for the muſcle's *ſpinning*, which from its ſhape is commonly called its tongue, is the mould in which its thread is caſt, and gives it its determinate length. Mem. Acad. Par. 1711.

SPINOSA, in zoology, the name by which the Italians call the porcupine. See the article HISTRIX.

SPINOSE-*leaf*, among botaniſts. See the article LEAF.

SPINOSI *piſces*, in zoology, ſuch fiſhes as have ſome of the rays of their backfins running out into thorns or prickles, as the pearch, *&c.* *Willughby*, Hiſt. Piſc. p. 271.

SPINOZISM (*Cycl.*)—We have an examination of *Spinoziſm*, and of Mr. Bayle's objections againſt this ſyſtem, by Monſ. de Jariges, in the Mem. de l'Acad. de Berlin, Tom. I. p. 121. and Tom. II. p. 295. Wolfius has alſo given a refutation of *Spinoza*, in his Theol. Nat. Part 2.

SPINTHER, among the Romans, a kind of bracelet which the women, in the firſt ages of Rome, uſed to wear on the upper part of their left arm.

SPINUS, in the natural hiſtory of the antients, the name of a foſſile body of a very remarkable quality; for according to the accounts of Theophraſtus, and other authors of the greateſt credit, if broke to pieces, and thrown in an heap expoſed to the ſun, it took fire and burnt, and that the more, if moiſtened or ſprinkled with water.

It ſeems to have been a ſubſtance nearly allied to what they called the *lapis thracius*, but with this remarkable quality, both of them ſeem to have been of the claſs of the harder bitumens, and are wholly unknown to us. Some late writers have imagined, that the common black ſlate-ſtone, ſo frequent with us in the coal-pits, was the ſubſtance called by Theophraſtus, and the antients, by this name, but it has none of the qualities attributed to the *ſpinus*. *Hill*'s Theophraſtus, p. 35.

SPINUS, in zoology, the name of a ſmall bird, called by ſome *ligurinus*, and in Engliſh the *ſiſkin*. Its head is black, and its neck and back green. The neck, however, has ſome ſlight admixture of a blackiſh tinge, and the roots of the backfeathers have alſo ſome blackiſhneſs. Its rump is of a greeniſh yellow, as are alſo its breaſt and throat. Its belly is white, and its tail is yellow underneath, with ſome browniſh ſpots. The female is paler coloured than the male, and its throat, and its ſides, under the wings, are whitiſh, with ſtreaks of brown. It is common in Germany and England, and is kept in cages for its ſinging. In winter theſe birds fly in large flocks. *Ray*'s Ornitholog. p. 192.

SPIPOLA, in zoology, the name of a ſmall bird of the lark kind, of which there are, according to Aldrovand, three ſpecies, ſuſpected by Mr. Ray to be only varieties of the *ſpipoletta*, or *tordino* of the Venetians. *Aldrovand.* de Avib. lib. 17. cap. 26. See the next article.

SPIPOLETTA, in zoology, the name of a ſmall bird of the lark kind, called *tordino* by the Venetians, and ſeeming to be the *ſtopparola*, as alſo the *griſola*, and *ſpipola* of Aldrovandus. It is ſmaller than the common lark; its head, neck, ſhoulders, and back, are of a greyiſh colour, with an admixture of green; its breaſt and belly white, and its throat ſpotted. The female differs from the male, in that her belly is yellow. The wing-feathers are of a duſky brown, with whitiſh or yellowiſh edges. Its tail is moderately long, and part of the feathers are ſnow-white, the reſt brown or blackiſh. The length of the heel diſtinguiſhes this bird from all others, except the lark kind, and it differs from all the ſpecies of larks in the colour of its beak and legs, which are black. It is common in the markets of Venice and other places. *Ray*'s Ornitholog. p. 153.

SPIRÆA, in botany, the name of a genus of plants, the characters of which are theſe. The flower is of the roſaceous kind, being compoſed of ſeveral petals arranged in a circular form. The piſtil ariſes from the cup, and finally becomes a fruit compoſed of ſeveral ſmall pods, containing oblong ſeeds.

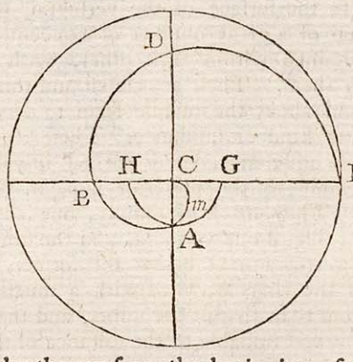
The ſpecies of *ſpiræa*, enumerated by Mr. Tournefort, are theſe. 1. The willow-leaved *ſpiræa*. 2. The opulus-leaved *ſpiræa*. 3. The *ſpiræa* with hypericum leaves, not indented. And 4. the Spaniſh *ſpiræa* with crenated leaves, reſembling thoſe of the hypericum. *Tourn.* Inſt. p. 618.

The ſeveral ſpecies of this plant are very common in our gardens, and make a very beautiful figure. They are propagated either by ſuckers, which they produce in great abundance, or by laying down the tender branches of the old plants. When they have taken root, they ſhould be removed into the nurſery for two or three years, and will then be fit for tranſplanting in the places where they are to remain. *Miller*'s Gard. Dict.

SPIRAL (*Cycl.*)—As a curve may approach continually to a right line, or to another curve, while they are both produced, and yet never meet it, ſo a *ſpiral* line may approach continually to a certain point, and not reach it in any number of revolutions, how great ſoever, that can be aſſigned. This happens in the logarithmic, or logiſtic *ſpiral*, and in ſeveral others. See *Mac Laurin*'s Fluxions, Book 1. p. 283, ſeq.

Some of theſe *ſpirals*, after having made an infinite number of revolutions, is ſaid, in the modern ſtile, to reach that certain point, and yet the length of the *ſpiral* may be finite, or equal to an aſſignable line. Propoſitions, expreſſed in this manner, ſeem the moſt myſterious of paradoxes; but the wonder diſappears, when we know it amounts to no more than that a line may continually increaſe, and yet the increments acquired may decreaſe in ſuch a manner, that it ſhall never amount to a given line.

SPIRAL *of Archimedes*. The *ſpiral* area CABDE, is equal to one third part of the circle, deſcribed with the radius CE.

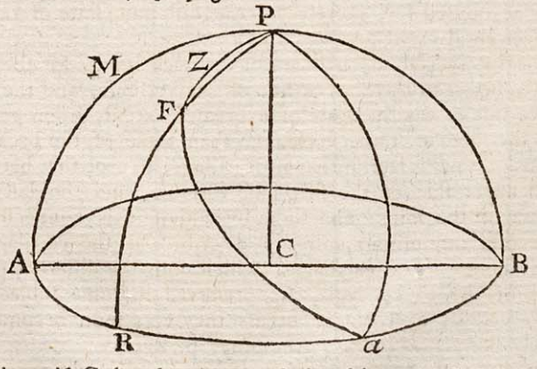


In like manner, the whole *ſpiral* area, generated by the ray drawn from the point C to the curve, when it makes two revolutions, is the third part of a ſpace double of the circle deſcribed with the radius 2 CE; and the whole area, generated by the ray from the beginning of the motion, till after any number of revolutions, is equal to the third part of a ſpace that is the ſame multiple of the circle deſcribed with the greateſt ray, as the number of revolutions is of unit.

Any portion of the area of the *ſpiral*, terminated by the curve C *m* A, and the right line C A, is equal to one third of the ſector C A G, terminated by the right line C A, and C G, the ſituation of the revolving ray, when the point that deſcribes the curve ſets out from C. See *Mac Laurin*'s Fluxions, Introd. p. 30, 31.

SPIRAL *of Pappus*, a *ſpiral* formed on the ſurface of a ſphere, by a motion analogous to that by which the *ſpiral* of Archimedes is deſcribed in plano. See the article SPIRAL, *Cycl.*

This *ſpiral* is ſo called from its inventor Pappus. Collect. Mathem. lib. 4. prop. 30.



Thus, if C be the center of the ſphere, ARBA a great circle,

circle, P its pole; and while the quadrant P M A revolves about the pole P with an uniform motion, if a point proceeding from P move with a given velocity along the quadrant, it will trace upon the ſpherical ſurface the *ſpiral* P F *a*.

Now if we ſuppoſe the quadrant P M A to make a compleat revolution in the ſame time that the point, which traces the *ſpiral* on the ſurface of the ſphere, deſcribes the quadrant, which is the caſe conſidered by Pappus; then the portion of the ſpherical ſurface, terminated by the whole *ſpiral*, the circle A R B A, and the quadrant P M A, will be equal to the ſquare of A B. In any other caſe, the area P M A *a* F P is to the ſquare of the diameter A B, in the ſame proportion as the arch A *a* is to the whole circumference A R B A. And this area is always to the ſpherical triangle P A *a*, as the inſcribed ſquare is to the circle. See *Mac Laurin*'s Fluxions, Introd. p. 31—33.

The portion of the ſpherical ſurface, terminated by the quadrant P M A, the arches A R, F R, and the *ſpiral* P Z F, admits of a perfect quadrature, when the ratio of the arch A *a* to the whole circumference can be aſſigned. See *Mac Laurin*, ibid. p. 33.

SPIRINCHUS, a name by which ſome authors have called the ſmelt. *Willughby*, Hiſt. Piſc. p. 202. See the article EPERLANUS.

SPIRITS (*Cycl.*)—*Brandy* SPIRITS. *Brandy* differs from wine *ſpirit*, in that the former is drawn from the poorer and thinner ſorts of wines, the latter from the richer and fuller bodied wines. *Shaw*'s Eſſ. on Diſtil. p. 128.

Brandy alſo differs from *ſpirit* of wine, as the former is only what they call proof high, or half pure *ſpirit*, half phlegm; whereas *ſpirit* of wine is raiſed higher, or carried by rectification to a further degree of purity.

Brandy alſo differs from ſtrong waters, as the latter is a compound, whereof the former, or pure *ſpirit* of wine, is only one ingredient.

The Portugueze are lately come into the way of making *brandy* [b]. The Greek *brandies* are the worſt, though made of the beſt wines [c].—[[b] Atlas Marit. p. 154. [c] *Tournf.* Voyag. du Levant, Tom. I. let. 2. p. 35.]

The Spaniſh *brandies* are much coarſer than the French, though ſometimes made to paſs for them in Holland, and other places of great traffic [d]. Some prefer Rheniſh *brandy* to that of France; and in Holland particularly, it ſells for double the price. It is indeed a fine *ſpirit*, but the Engliſh know little of it farther, than that a daſh thereof ſerves to fill up a caſk of French [e]. Some tell us of frozen *brandy*, of which Mr. Boyle gives an inſtance in Ruſſia; but it is only the watery part that is capable of congelation. All the effect of the moſt intenſe cold on *brandy*, is to make a ſeparation between its *ſpirit* and phlegm; the former retires to the center in form of pure alcohol, while the latter inveſts it with a circumference of ice [f].—[[d] *Shaw*'s Eſſ. on Diſtil. ſect. 5. p. 139. [e] Id. ibid. p. 141, ſeq. [f] *Boyle*'s Works Abr. Tom. I. p. 594.]

Brandies always differ, according to the different ſpecies and growth of the grapes. We have various kinds of French *ſpirits*, having each their particular flavours, by which the connoiſeurs readily diſtinguiſh one ſort from another; though the vulgar call them all indiſcriminately by the name of *French brandy*. An ordinary judgment may eaſily diſtinguiſh Languedoc *brandy* from that of the iſles of St. Martin and Oleron; or Bourdeaux from Cognac. Nor would the ſimilitude between the ſeveral ſpecies of French *brandies* be ſo great as it is found, but that only the weakeſt and loweſt flavoured wines are diſtilled for this purpoſe; or ſuch as are unfit for other uſes. When out of curioſity, or good huſbandry, the French diſtil the bottoms, or refuſe parcels of the groſſer bodied and fuller taſted wines, the *brandy* got from them is what we in England rather call a wine *ſpirit*, than a *brandy*. Every kind of grape, as it affords a wine, ſo does it alſo a *brandy* of its own peculiar flavour. *Shaw*'s Eſſ. on Diſtil. ſect. 5. p. 130, ſeq.

The too free and frequent uſe of *brandy* is attended with ill effects, as it attenuates the body, and impairs the ſtrength, and ſtupifies the brain. In perſons who have died hereof, the blood has been found thick and coagulated; the pancreas dried; the liver ſchirrous, and almoſt petrified; the glands tumefied beyond their natural bulk [g], *&c.* But what ſhall we ſay to the Pariſian woman, who was burnt to aſhes with a fire only kindled from the *brandy* in her body [h]? Conringius even attributes the degeneracy of the modern from the antient Germans, to the prevelancy of drinking this liquor [i].—[[g] Hiſt. Acad. Scienc. Anno 1706. p. 29. *Barth.* Act. Med. Tom. V. Obſ. 118. p. 313. [h] Philoſ. Tranſ. N° 97. p. 6138. *Barth.* l. c. Tom. I. Obſ. 118. p. 211. [i] *Conring.* de Habit. Corp. Germ. p. 99, ſeq.]

In the hot climates of America, they are ſaid to make clyſters of *brandy*. A perſon who had experienced the uſe of one of theſe fiery enemata, made of a pint of *brandy*, aſſures us, it not only made him dead drunk, but raving mad. Phil. Tranſ. N° 37. p. 721.

Brandy is alſo applied, in a leſs proper ſenſe, to all *ſpirituous* inflammable liquors, drawn from vegetables by diſtillation. In which ſenſe *brandy* includes all ardent, or inflammable *ſpirits*, uſed in the way of beverage. Dr. Shaw adds a further limitation to *brandy ſpirits*, *viz.* that they be proof high, or conſiſt of equal quantities of water and alcohol. On which footing, *ſpirits*, either above or below proof, do not come under the appellation of *brandies* [k]. But in the popular uſe this diſtinction is not kept to.—[[k] *Shaw*'s Eſſ. on Diſtil. ſect. 5. p. 130.]

Arrac, rum, malt and melaſſes *ſpirits*, in this ſenſe, are *brandies*, though under another denomination.

In the iſland of Andros they make brandies from the fruits of the arbutus and mulberry trees. Atlas Marit. p. 176.

A patent was ſome time ago obtained for making *brandy* from carrots and parſneps; the latter of which is ſaid to have nearly reſembled French *brandy* [l]. Of late we meet with frequent advertiſements of raiſin-*brandy*, which, if really made of that fruit, is neareſt akin to wine-*brandy*.—[[l] *Hought.* Collect. Tom. II. p. 382. 461.]

Apple, or cider-*brandy*, is alſo praiſed by ſome.

Cider is found to yield an eighth part of good *ſpirits*, and if cloſe kept a year or two in a cool place, much more. Dict. Ruſt. Tom. I. in voc.

Brandy is alſo uſed to denote certain compound liquors, whereof *brandies* are the baſis.

Such are raſpberry-*brandy*, cherry-*brandy*, gooſeberry-*brandy*, &c.

Cherry-*brandy* is uſually made with black cherries, by filling a bottle half full with them, and adding *brandy* thereto till the bottle be full; this being ſhaken from time to time, within a month will be ready to drink.

If the like quantity of gooſeberries, inſtead of cherries, be put in, it makes a good *brandy*. To dulcify it, and give it a fine flavour, they alſo put in ſugar with raſpberries. Dict. Ruſt. Tom. I. in voc. *cherry-brandy*.

The French method of diſtilling *brandies* is the ſame with that practiſed by our diſtillers, in working from waſh or wines; only that the former throws a little of the natural lee into the ſtill along with the wine, which gives the *ſpirit* a flavour, on which a great part of its merit depends. *Shaw*, lib. cit. p. 132.

When *brandies* prove foul, ſeedy, or retain the taſte of certain weeds apt to grow among the vines, they draw them over again, in order to cleanſe them of that adventitious flavour: in which operation they leave out the faints, or rather change the receiver, as ſoon as the ſtream begins to run proof. Then mixing together all that run off before, they call it *trois cinque*, that is, *brandy* conſiſting of five parts alcohol, and three of flegm; beyond which the French *bruleurs*, or common diſtillers, rarely go.

The yearly export of *brandies* from France is ſaid to amount to 25000 tuns; an article of itſelf ſufficient to enrich a moderate country [m]. While the duty on French *brandy* continued at 9*l.* the tun, the Engliſh alone took 10 or 11000 tuns off their hands [n]; but now that the duty is raiſed to 52*l.* the tun, the importation is greatly reduced, to the advantage of the Engliſh Diſtillery, except that ſmuggling ſtill intervenes.—[[m] Atlas Marit. p. 146. [n] Compl. Engl. Trad. Tom. II. p. 89. Atlas Marit. p. 107. *Hought.* Collect. Tom. II. N° 387. p. 470.]

Divers reaſons may be alledged for the great fecundity of *brandies* in France. All thoſe poor grapes, which prove unfit for wine, are uſually firſt gathered, preſſed, and their juice fermented, and directly diſtilled: this rids their hands of their poor wines at once, and leaves their caſks empty for the reception of better. It is a rule with them to diſtil no wines that will fetch any price as wines, for in this ſtate the profit on them is vaſtly greater, than when reduced to *brandies*. This large ſtock of ſmall wines, wherewith they are almoſt over-run in France, ſhews one great reaſon of their making ſuch vaſt quantities of *brandy*, more than other countries, which lie warmer and better for grapes. But this is not the only fund of their *brandies*; for all the wine that pricks, or turns eager upon their hands, is alſo condemned to the ſtill; and, in ſhort, all that they can neither export, nor conſume at home, which amounts to a large quantity, ſince much of the wine, laid in for their family proviſion, is ſo poor, as not to keep the ſpending. *Shaw*'s Eſſ. on Diſtil. ſect. 5. p. 131, ſeq.

The colour of their *brandies* is acquired from the caſk, and the length of time they uſually lie therein, which is ſometimes twelve or eighteen months, and often two or three years; during which, it is no wonder if they acquire a yellow or browniſh caſt. Their lying thus long, as it were, in a ſtate of ſlow digeſtion, wonderfully takes off from that hot, acrid, and foul taſte, peculiar to all *ſpirits*, or *brandies*, newly diſtilled; and gives them a coolneſs and a ſoftneſs, not eaſily introduced by art. And on theſe properties are founded ſeveral methods of trying their goodneſs, or diſcovering whether they are debaſed or adulterated by the admixture of coarſer *ſpirits*. Phil. Tranſ. N° 391. p. 398, ſeq. *Shaw*'s Eſſ. on Diſtil. ſect. 5. p. 134.

Brandies are rarely adulterated in France, where they have no cheaper *ſpirits* to debaſe them withal; and the like holds, in great meaſure, in favour of the Dutch, though otherwiſe